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THE SURGICAL CLINICS OF NORTH AMERICA

Volume 8

Number 4

CLINIC OF DR. JOHN CHALMERS D'ACOSTA

JEFFERSON MEDICAL COLLEGE HOSPITAL

CARCINOMA OF THE RECTUM

Case I—The first case which I present to you today is L. W. male white nineteen years of age. I ask your particular attention to the fact that the patient is but nineteen years of age a statement I shall have occasion to refer to later. He came to us because of increasing constipation, severe persistent back ache and a moderate degree of rectal pain upon each act of defecation. His mother and father, one brother and one sister are living and well. No record has been obtained of any cases of cancer, diabetes, cardio-renal disease or tuberculosis in the family. His general health has always been good except for the usual infectious diseases of childhood. About four months ago he began to experience difficulty in getting bowel movements, he took to the use of mineral oil but obtained little relief and then began to employ saline purgatives. The persistent constipation was followed after a few weeks by what he called diarrhea. He passed mucus eight or ten times a day. On waking in the morning the desire to go to stool was immediate and persistent but he could pass nothing but mucus. Later in the day he succeeded in passing a small amount of fecal matter. He felt each time he went to stool that something remained unevacuated. He tried and struned to get rid of it but failed. As Mirabeau said (but in regard to another matter) he was like a eunuch in love he would but could not. You will observe that this man had constipation associated with an excess of mucus (mu

cous diarrhea) indicating a condition of inflammation of the mucous membrane of the colon about and above some point of constriction : *e* chronic obstruction. The onset of the trouble was marked by constipation of feces and soon by frequent passages of mucus. The constipation the mucous discharges the insistent desire to go to stool early in the morning with a practical futile result and the persisting desire even immediately after a mucous passage are very suggestive of a growth in the rectum. The condition continued practically unchanged for a few weeks and then he noticed that the mucus often contained considerable blood. From then until now almost every movement has been obviously bloody. At that time an examination was made of the rectum and it was said by the surgeon of another institution that a tumor existed. For a considerable time the patient has had a persistent pain over the sacrum a pain which is at times so severe as to keep him awake at night and during and for a time after defecation he has pain in the rectum. Pain does not—as in some cases—radiate into the thighs the knees or the heels. The blood examination shows 4 000 000 red blood cells 9400 white blood cells per cubic millimeter and 75 per cent of hemoglobin. The Wassermann blood reaction is negative. You already know that one negative blood Wassermann is not conclusive. The man denies syphilis but that would not be conclusive even were he a Sunday school superintendent. In fact a Sunday school superintendent having a reputation for sanctity to maintain :—as a general proposition—less reliable in such a matter than is an ordinary unregenerate citizen.

Examination—On inspection the anal folds being separated we observe nothing but bluish congestion of the mucous membrane and distention of the veins.

On making a digital examination he being in the knee chest position it is found that the sphincter is decidedly spasmodic and the mucous membrane of the anal canal is dark red. The finger finds a spasmodic sphincter. The anal canal strongly resists the examining finger. Something more than 2 inches above the anal canal the finger feels an indurated area which practically encircles the rectum but is far more marked on the right side than

on the left The base is broad and the margins are very hard but the center is soft and nodular and evidently ulcerated Examination with the finger causes a considerable flow of blood *Examination with the proctoscope*—the patient being in the knee chest position—makes the condition evident Dr Shallow observes the dark red rectal mucosa a protrusion into the lumen and a bleeding soft lobulated central area from which bloody mucus is flowing and notes very great lessening of the diameter of the rectum at this point It is of course impossible to employ the sigmoidoscope because it could not be introduced through the growth the caliber of the bowel being so diminished that even the finger cannot be passed through it *x Ray examination* was made of the body at large although no attempt was made to examine the rectum by the *x rays* after a colonic injection No *x ray* evidence was found of metastasis to any of the bones of the pelvis to the lungs or to the bones of the extremities The pulmonary margins are well within the normal limits for an individual of his age Some evidence was found of infectious change at each root area but there was no evidence of metastasis in any portion of either lung The particular features to dwell on in this case are the early age the absence of any suggestion of malignant disease in ancestors or relatives the onset of the trouble with constipation and the early development of repeated passages of bloody mucus desire being most urgent on rising in the morning Examination of the abdomen by palpation failed to detect any intra abdominal masses or any nodules in the liver We will now have the patient taken out of the room It would have been little short of brutality to have discussed this man's disease while he was here to listen to our very gloomy views

While it is obvious that in an older man nobody would hesitate for a moment in making a diagnosis of carcinoma of the rectum we are halted by the inquiry Does the early age of the patient forbid the diagnosis of cancer? Most positively it does not It is true that as a rule in most portions of the body, and also in the rectum cancer is a disease of middle life or of advancing years and it is also true that cancer of the rectum is

most common after the age of forty but anywhere in any region of the body early cancer or even juvenile cancer may occur and the large intestine seems to show a particular disposition to the development of early cancer. Not a few cases of cancer of the rectum and large intestine occur in patients under the age of thirty and cases have been reported in individuals under twenty. In fact a case has been reported in a child of thirteen and another in a child of twelve. When cancer occurs in youth it must mean that the tissues have a very low resistance to the irritation which excites cancer or else that the cause itself whatever it is must be highly intense and provocative. One thing we do know viz. that cancer occurring in youth is practically certain to be rapid in progress which probably means lessened tissue resistance to the cause of cancer. In this patient for instance the first symptoms were observed only about four months ago and he has already reached a stage of considerable obstruction. Not only has he reached a stage of considerable obstruction but his general health is failing. He has lost weight and although he does not know how much the laxity of his skin on pinching showed that the loss must be estimated at a number of pounds and he is still rapidly losing flesh. Because this person is only nineteen years of age we have no possible right to exclude the diagnosis of cancer. To follow the hard and fast rule that cancer occurs only at the age of thirty or beyond will be certain to plunge us at times into grave diagnostic mistakes and to lead some patients into ghastly misfortune. The absence of a history of cancer in the family of course does not count at all not uncommonly we find such a history in cases without cancer and often we find no family history in cases of cancer. Even when we learn that an ancestor or relative died of cancer the statement may be an error and when we are told that no ancestor or relative ever had cancer that statement may be a mistake. An enormous number of persons have no possible notion what their grandfather or grandmothers died of. This is not to be wondered at when some rich and educated people high in social life scarcely know who their grandfathers and grandmothers were. In the next place a

person may think and have been told that a certain member of the family died of cancer and yet the diagnosis may have been wrong. There is only one form of statement which would carry absolute conviction and that is the sort of statement which it is impossible to get which would be that a person or persons in the family supposed to have had cancer had been subjected to surgical operation or to postmortem examination and that the tissue removed was examined and had proved the existence of cancer. It is obvious that such information is almost never obtainable. Of course we can sometimes get clear statements pointing strongly to heredity and such statements are particularly valuable when several members of a family seem to have suffered from the disease. There are families whose tissues are strongly predisposed to cancer. Take the family of the great Napoleon. His father Charles Bonaparte, his brother Lucien and his sisters Pauline and Caroline died of cancer of the stomach. Never make a diagnosis of cancer simply because another member of the family had the disease and equally never decline to make a diagnosis of cancer because no member of the family had the disease. But the fact that in certain families there is a tissue predisposition to cancer when the tissues are subjected to the cause of cancer—whatever it is—seems to be undoubted. Of course we do not know how long ago this particular growth began, we only know the duration of the symptoms and it is undoubted that the growth existed for some time before any symptoms appeared but the development in this case has been so rapid that we are justified in concluding that the whole period of the disease has been brief.

Could this condition be syphilitic? Syphilis of the rectum is not very uncommon. Syphilis is particularly apt to cause inflammation of the rectum and outside of the rectum. This chronic inflammation causes thickening, shortening of the rectum and stenosis from scar tissue. In this scar tissue usually are spots of granulation. Obviously there is nothing of the sort here. There may or may not be ulcers but ulceration is not the essential feature of fibrous syphilis. The lesion covers a wide area and is conspicuous because of its highly contractile

qualities This man—it is to be noted—has a negative Wassermann reaction which as I pointed out previously is of course not conclusive unless tested out by several trials and by a trial after the administration of salvarsan Clinically it positively is not syphilis Syphilitic ulcers of the rectum are typically gummatous are usually multiple and tend to produce fistulae

One must of course think of tuberculosis because tuberculosis may be responsible for ulceration of the rectum although it seldom is the disease being far more common much higher up in the colon that is in the cecum

There are no signs of syphilis throughout the body Syphilis of the rectum as a rule begins with diarrhea and a very profuse flow of mucous pus Areas of granulation may form and subsequently stricture may be confused with scirrhus carcinoma but scarcely with adenocarcinoma Scirrhus carcinoma is rare at such a low point in the rectum its common position is near above or in the sigmoid Scirrhus stricture occurs in regions where syphilis is rare and syphilis occurs where scirrhus stricture is rare Again the appearance is different In a scirrhus stricture the proctoscope or sigmoidoscope exhibits darkly congested mucous membrane which is ulcerated centrally but the mucous membrane over a syphilitic stricture is smooth and shows areas of granulation but seldom marked ulceration No attempt has been made to remove a piece of the growth for study Obviously the abdomen must be opened in any case and it seems undesirable to waste time and to expose the patient to the possible danger of rapid spread which might follow the removal of a section for examination Cancer (adenocarcinoma) seems the only ford by which we can cross the River of Diagnostic Doubt

What is to be done for this patient?

It is desirable whenever possible in a case of carcinoma of the rectum to perform radical extirpation by the method of Coffey It is not possible in any case to determine by rectal examination from below even aided by abdominal palpation whether radical operation is possible or not We may affirm the following points If there are demonstrable lymphatic enlarge

ments evidently malignant for instance in the abdomen or groins or if there are masses which are palpable along the iliac vessels or in the region of the veterbræ or in the left subclavian triangle if nodules can be detected in the liver or if the rectum about the growth is firmly adherent to perirectal structures (the bladder the prostate or the coccyx in the male) the case is inoperable. Even fairly extensive adherence to the vagina does not forbid radical operation. If the patient is in an obvious state of cachexia and marked anemia if the hemoglobin percentage is in the fifties or lower or if the digestive functions are so profoundly disturbed that the patient cannot assimilate food radical operation is contraindicated. In trying to determine that distant metastases are absent it is wise to take skiagrams of the lungs and of the long bones also to palpate the left subclavian triangle for lymphatic enlargements. The mere fact that the liver is somewhat larger than normal on palpation is not proof that there is metastasis in that region but if nodules are palpable we may be sure there is. Inability to feel nodules does not prove that there are none. If the digestion is grievously crippled there is practically no chance for a patient with rectal cancer to pass successfully through the great shock and prolonged depression which are bound to follow such an extensive surgical procedure as radical extirpation. There is some difference of opinion as to how far adhesions to the bladder and rectum forbid operation some surgeons regard early adhesions as entirely inflammatory and unhesitatingly divide them at operation and strive to remove the growth radically. I believe that adhesions do not last long without becoming at least bridges for carcinoma cells that fibrous adhesions are certainly cancerous and that firm and extensive adhesions to the coccyx bladder or prostate forbid operation. Marked anemia and low hemoglobin mean metastasis whether the surgeon is able or not to locate its seat and of course forbid radical operation. Radical operation attempted when metastasis exists is useless mutilation. In this case we know certainly the lower level of the growth. The upper level is uncertain because neither the finger nor the sigmoidoscope will pass. Cancers below the rectal fold of

peritoneum leave that structure free cancers which reach the upper rectum will sooner or later involve the peritoneum. Involvement of the peritoneum causes rapid dissemination of the growth through the abdominal cavity and forbids radical operation. Of course advanced kidney or cardiorenal disease forbids operation. In very many cases we find just the condition which presents itself here we know that there is a cancer we know the lower level of that cancer that the cancerous mass is still movable upon the perirectal structures and that the cancer having occurred at such an early age is probably highly malignant. How far up it extends we do not know nor do we know the degree of lymphatic involvement or if there is visceral involvement. There is only one way to find out these things and that is by an exploratory operation. A number of years ago I made up my mind that never again would I perform a radical operation for cancer of the rectum without previously opening and exploring the abdomen. Until that has been done too much is unknown without it there is too much guessing too many chances are taken and the surgeon may perform a mutilating and dangerous operation which could not possibly be of the slightest service. The incision for exploration should be made near the midline. I used to make it in the inguinal region so as to utilize the cut subsequently for the making of an artificial anus but the exploratory incision must be sufficiently large to allow of the introduction of the entire hand and such a large incision in the inguinal region will not permit the formation of as satisfactory an artificial anus as will a smaller incision made for that purpose only. For a number of years our custom in this hospital has been to make first of all the abdominal exploratory incision near the midline introduce the hand and carry it into the pelvis. The surgeon then finds the upper level of the carcinoma whether or not the cancer is adherent to the parts about the rectum and if adherent to what parts and to what extent. He finds whether there has been a break into or infiltration of the ischioanal fossa the degree of involvement of the retrorectal the iliac and the sacral glands the extent of distention and thinning of the bowel above the carcinoma and

if there is a nodule or are any nodules in the liver or spleen After these things have been determined the surgeon will be in a position to decide positively whether he will perform a radical operation If he feels it is not a case for radical operation—and probably even in cases which he thinks suitable for radical operation—he will perform inguinal colo tomy In the procedure of Kraske the inguinal colostomy precedes by a number of days the radical operation In some present day procedures both operations may be carried out at the same time In view of the possibility—I may say the probability—that an artificial anus will be made the surgeon is in duty bound to have told the patient the situation before operating to explore The surgeon must have obtained full permission from the patient to do exactly as he pleases No operator has a right—without the patient's knowledge—to do such a thing to him as to perform a permanent colostomy the condition is in many respects too dreadful too hope destroying and too humiliating to the patient and the victim has a right to know all about it before he agrees that it should be done Of course it is entirely possible in certain abdominal conditions that the surgeon may be confronted with an unexpected situation in doing an abdominal operation for any purpose which may demand an immediate colostomy or ileostomy In such a case operating in a surgical emergency the operator had no chance to gain permission to perform the operation because he did not know himself that he would have to perform it But this is not the case in cancer of the rectum Before operating on such a case the surgeon knows that he is going to make or may have to make an artificial anus and consequently he should have the patient's full permission Should the patient refuse the permission the surgeon should refuse to operate I am teaching what I hold as my own view that is that a surgeon should not undertake the surgical care of a case of cancer of the rectum unless he has obtained permission to open the abdomen for exploration and he should not open the abdomen for exploration unless he has the patient's permission to make an artificial anus if necessary That is exactly what we are going to recommend to the patient that is

Another feature of this case is the finding of nodules in the liver so soon after the discovery of the growth in the rectum



Fig 216—Shows the nodules in the rectum and the bowels (Sigmoid)

In a certain number of cases of even very small and recent growths of the rectum nodules develop in the liver very early



Fig 217—Nodules in the rectum (Sigmoid)

This observation led me years ago to the conclusion that we should never perform a radical operation for cancer of the rectum without a previous abdominal exploration. The patient is now

perfectly comfortable the artificial anus functionates well and we recommend him to use a special form of pad and dressing



Fig 218 —Next step (Keen's Surgery)

devised by a patient of Dr Keen. An artificial anus in which the bowel has been completely cut across as described above



Fig 219 —Abdominal bandage and T bandage applied (Keen's Surgery)

seldom permits any fecal accumulation below the opening and is rarely followed by absolute incontinence of feces unless diarrhea should arise. In many cases the bowels move two or



Fig 220—Front view of the throat (K. Sugr.)



Fig 221—Back view of the throat (K. Sugr.)

three times a day perhaps giving a brief warning before each movement but sometimes giving no warning at all. A rubber bag of any kind is entirely unsatisfactory it soon ceases to fit leaks around the margin and becomes unspeakably foul. A truss is very much better. Layers of cotton are placed over the artificial anus over them a rubber cloth is laid and then a binder is fixed in place and outside of the binder a truss is adjusted while the patient is standing up. This is by far the most useful appliance which I have ever used.

Case II — The next patient I have to show you is Mrs. B. S. colored aged twenty nine. She comes to us because of frequent discharges of bloody mucus from the rectum. She also complains of inability to obtain anything resembling a free fecal movement. The desire to go to stool is imperative on rising in the morning but only bloody mucus can be passed, and the passage gives no feeling of relief. She also complains of some pain in the rectum on and after defecation pain in the sacrum and attacks of colicky pain in the abdomen, especially in the right iliac region. Her mother died at the age of forty from cancer of the rectum her father five sisters and one brother are living and well one sister died at the age of fifteen of tuberculosis. The patient lived with this tuberculous sister for nine years. Nothing is known of other relatives or of grandparents. There is no suspicion that any other member of the family has or had cancer or tuberculosis. In the previous case I discussed with you briefly some facts relating to hereditary tendency to cancer. I have nothing to add to that discussion now. The fact that in a colored family residing in the North predisposed as the race is to tuberculosis when transported from the South only one member out of nine is alleged to have been tuberculous does not suggest a strong tuberculous tendency.

The patient before us previous to the development of the present condition has been in good health except for the ordinary diseases of childhood and an attack of typhoid fever about ten years ago. The woman has been always of a more or less constipated habit during many years and during all of those

years was accustomed to take some sort of laxative once or twice a week. Such a condition is common in women. She did not observe that the condition was growing worse until the fall of 1926 when the laxatives became less efficient and she noticed that the mucus which she had begun to pass some months before was frequently stained with blood. The blood stains were occasional the presence of the mucus was constant at every stool. Constipation was growing worse and worse and laxative became less and less effective. She would have eight or ten mucous movements a day and then perhaps a purgative would cause a fecal movement. At the present time she does not have even under purgation any frankly fecal movements. The first thing she has to do in the morning is to go to the closet. She has a harassing sense of uneasiness all day not relieved by mucus movements. She took medical advice and a diagnosis was made without any examination of hemorrhoids and she was given suppositories. The constipation and the mucous discharge became progressively worse. In March of 1927 she had her tonsils removed--the laryngologist maintaining that no operation was necessary for the rectal trouble. The condition of constipation mucous diarrhea passages of bloody mucus from time to time and attacks of abdominal pain still continued. In June she had an operation performed for hemorrhoids although apparently nothing else was at that time discovered in the rectum and we do not know whether the rectum was ever examined above the pile bearing area. She thinks that since the operation there has been less blood less mucus and less constipation and once in a while she has had a fecal movement without blood. The fact is that she has passed on several occasions formed stool but they were never tape like. A couple of months ago the pain in the pelvis and back became more noticeable and the attacks of abdominal pain began to be associated with some distention of the cecum and tenderness in the right iliac fossa. However she often goes for several days at a time without an attack of pain. When Dr. Shallow examines the rectum he finds that it admits the index finger with much difficulty the sphincter being tight and spasmodic. The finger

detects a hard indurated area encircling the rectum and a short distance above the anal canal. The mucosa is darkened. Examination with the proctoscope shows an ulcerated area with raised and indurated margins which oozes blood on touching. The induration almost encircles the lower portion of the rectum. X-ray studies show metastatic involvement of the right iliac bone close to the sacro iliac articulation and also involvement of the sacrum. There are no other evidences of bony involvement found throughout the skeleton. There is no x-ray evidence of metastasis to the lungs and there are no physical signs to indicate pulmonary disease. No nodules can be palpated upon the liver. We will now send the patient out.

In the first place it becomes evident that this woman has been laboring under rectal trouble for a long while and that there was prolonged neglect in making a rectal examination. It is a dreadful thing to simply guess without any examination or to guess from merely examining the anus or to guess from a mere digital examination. Every rectal trouble demands thorough examination not only examination with the finger but also by means of the proctoscope or if the lesion be high up of the sigmoidoscope. We find another interesting thing that whereas it was considered necessary to remove her tonsils the condition of the rectum seems to have excited no apprehension whatever. The interest and attention seem to have been devoted entirely too much to the wrong end. Then comes the fact that about five months ago an operation was actually performed for hemorrhoids and yet apparently the indurated ulcerated area was not discovered at that time. This could only be because it was not sought for. Every surgeon sees cases of cancer diagnosed as hemorrhoids simply because of the blood but in which no hemorrhoids exist. Again he sees cases which have been operated on for hemorrhoids examination not having been conducted to a high enough level to detect the cause of the hemorrhoids viz cancer.

The blood examination in this woman disclosed anemia 3 500 000 red blood cells about 7000 white blood cells and 65 per cent hemoglobin. She is losing flesh her digestion is much

impaired and there are attacks of pain in the right iliac fossa. Such attacks are not unusual in cases of carcinoma of the rectum as was mentioned in dealing with the previous case. The large intestine dilates above the carcinoma and dilates to a greater degree where the gut is thin walled and of large caliber as in the cecum and ascending colon than where it is thick and of comparatively small caliber that is right above the cancer. Whereas stercoral ulcers may form in the neighborhood of and just above the cancer they may also form in the ascending colon and in the cecum. A person who passes at times bloody mucus may think he has hemorrhoid because of distension pain and tenderness in the right iliac fossa a physician may think that the patient has appendiceal trouble. In either case a properly conducted examination would have cleared up the diagnosis. When we consider the rather rapid loss of flesh the progressive anemia the decided fall in hemoglobin and the metastasis noted in this patient we think it certain that a radical operation could promise no benefit. As in the previous case we insist on opening the abdomen for exploration and on having permission to make an artificial anus.

Note—A few days later Dr. Shallow opened the abdomen under ether anesthesia. The incision was made along the inner side of the right rectus muscle and that muscle was retracted externally. There were very dense adhesions to the uterus and other pelvic structures. Enlarged adherent and fused lymphatic glands were found along the iliac vessels on both sides along the sacrum and in the lateral vertebral region. No nodules were palpable on the liver but the fact that there are metastatic deposits in the bones of the pelvis and in the sacrum render it certain that a radical operation is out of the question. Inguinal colostomy was performed as in the previous case. The patient was returned to the ward and the bowel was subsequently opened as previously stated.

In this case one might properly have thought—because of the race and because of the fact that one case of tuberculosis had existed in the family—of the possibility of the lesion being tuberculous. The absence of any discoverable tuberculous lesion

elsewhere and of any history of such a lesion and the failure to find any healed lesion in the lungs or elsewhere were against that diagnosis. Tuberculosis of the rectum is occasionally primary but it is usually secondary. Early in the case there are apt to be multiple ulcers and these extend up the rectum so as to cover a considerable area. Then the ulcers coalesce and spread in various directions the higher ulcerations tending to spread around the circumference of the bowel following the vessels. The typical tuberculous ulcer is crater shaped with ragged and irregular edges free from induration. The floor is somewhat elevated and is either grayish in color or contains areas of yellowish caseation. Only a little blood if any oozes on touching a tuberculous ulcer with a probe. There is the same complaint of mucous diarrhea as in cancer cases and now and then a little blood may fleck the mucus. There is also commonly the same complaint of pain in the back. There is no real stricture. The discharge of a tuberculous area is usually extremely foul. Cancer when widely ulcerated and especially when sloughing also produces a very foul discharge. In the old days before we had rubber gloves after one had examined digitally the rectum in a case of cancer he was disturbed to find that do what he would the odor lingered on the finger. Years ago Lawson Tait maintained that after a surgeon had examined a cancer of the rectum or a cancer of the uterus and while this odor still lingered upon his finger the performance of an abdominal operation by that surgeon would nearly always be provocative of fatal peritonitis in the patient.

I should have added about this patient that the Wassermann reaction was negative. Even in spite of this it is certain that there was no diffuse fibrous inflammation the usual lesion produced by tertiary syphilis. Such a fibrous area extends for a considerable distance up and down the tube and surrounds the rectum. The fibrous area contains spots of granulation and it progressively constricts and shortens the rectum. Gummatous ulceration may be solitary but is apt to be multiple and looks like a gummatous ulcer anywhere *i. e.* with the yellow wash leather looking base. The floor of a gummatous ulcer of the rectum is

is the weak side. The muscles are spastic on the right side and when any attempt is made at voluntary motion we find that it is the left side which has real power and the right side which presents impaired power this being the side we recall on which there is deafness. Following the recommendation of Purves Stewart we develop associated movements on the side of the spasticity. When the patient crews his eye up forcibly on the right side the mouth on that side is pulled toward the right and on haring the upper teeth on that side into a sort of snarl the right eye closes. This spasticity means that the nerves and muscles have gone a considerable distance on the road to recovery but have not completely recovered. The articulation is somewhat impaired speech is slightly blurred particularly for labial consonants. In addition however there is something else wrong with speech the man now and then hesitates between words breaks off syllables and at times even uses wrong words. Part of this condition is cortical (wrong word and dropped syllable) part is due to trouble with the lips and tongue. There is some tremor of the lip when he speaks and on projecting the tongue definite tremors are observed passing along it as puffs of wind may pass over a field of wheat causing irregular curves and bends. Taste in the tongue has not as yet been tested but should be to complete the case. Of course we know nothing about the condition of the taste soon after the original injury—while he was in the Philippine Island. If as seems highly probable the skull was fractured years ago when he was struck with a revolver butt and that the fracture involved both the facial nerve and the eighth nerve of the right side we should assume that the auditory nerve and facial nerve were injured by a basal fracture involving the internal auditory meatus where the seventh and eighth nerves lie close together. Had the fracture of the base simply entered into the aqueduct of Fallopius and not involved the region of the internal meatus it would not have injured the auditory nerve and would not have caused deafness although it would have damaged the chorda tympani nerve and caused loss of taste in the anterior two third of the tongue of the same side and probably paralysis of the nerve to the stapedius.

muscle with the result that any loud sounds would have produced most painful sensation (hyperacusis) Injury to the motor root anywhere above the emergence of the stapedius branch causes stapedius palsy which of course cannot be demonstrated when deafness exists When we come to examine by careful palpation the seat of the supposed fracture we find a crack and a long narrow line of marked tenderness on pressure along the crack This is not the tenderness of the superficial hematoma but is obvious bone tenderness and is one of the definite signs of fracture of the vault of the skull An x ray picture which I here show demonstrates that there is a fracture of the vault of the skull tracking downward along the parietal bone toward the base although the x ray report states that it is impossible to say whether this is an old or a recent fracture It would seem to the humble surgical mind that absence of all bony changes and that the existence of a definite linear tenderness show that it is a recent fracture So as far as we have gone in this case we may sum it up by saying that the man had a fracture of the base years ago and in that fracture of the base the seventh nerve and the eighth nerve were damaged that the eighth nerve has never recovered itself but that total deafness remains and that the seventh nerve has partially recovered a condition of facial spasticity existing upon the injured side Furthermore that this patient has a plus four Wassermann and with the fact that one pupil is larger than the other there are some lip tremors while speaking there are tremors of the tongue and there is some blurring of the articulation and the impairment in articulation is something beyond the difficulty with labial consonants as met with in pure facial palsy There is a mixing up and leaving out of words or syllables (which is cortical in origin) It would seem that we are dealing with a case of paresis besides the two traumatic conditions—the one due to the old injury and the other to the recent fall You know that anyone with paresis is liable to sudden attacks of epileptiform nature This man had a fall because of an epileptiform seizure due to paresis and in the fall he struck his head The blow on the head caused concussion of the brain fracture of the vault of the skull and

bleeding beneath the arachnoid. He has now recovered entirely from the concussion the blood has passed away from the cerebrospinal fluid and the fracture being a simple fracture of the vault seems to offer no particular elements of danger. But the man had has and will continue to have paresis and he must be subjected to the proper treatment by skilled practitioners who pursue the specialty of neurology. I gather from the medical journals that a great deal more can be done for paresis than was possible a few years ago and that at the present time we employ not only specific treatment but that in some cases at least the infection of the patient with a certain type of malarial fever has proved most remarkably beneficial. I learn that my neurological colleagues regard the condition as paresis. An interesting thing to bear in mind about this case is that whenever a man is picked up unconscious if no one saw him struck or stumble or reel and fall we must endeavor to find out whether he fell because of an attack like epilepsy or vertigo or apoplexy if so the head injury is secondary thereto. Determine if the condition is due entirely to a head injury from a blow or from a fall. In this case there is of course no possible thought that a surgical operation should be performed.

CLINIC OF DR JOHN B. DEEVER

DISCUSSION AND PRESENTATION OF CASES LINKENAU CLINIC

THE CHRONIC GALL BLADDER

INTEREST in the gall bladder continues unabated in spite of or perhaps because of familiarity with gall bladder surgery and the large amount of investigation carried on with regard to its function symptomatology and pathology. For this reason instead of presenting all the cases of the clinic today I shall confine myself to several instances of gall bladder disease prefacing my remarks with a short discussion on chronic disease of the gall bladder.

The question of diagnosis of chronic cholecystitis is receiving increased attention since cholecystography has been added to the diagnostic aids of the disease. Before the discovery of Graham and his associates that with the use of tetraiodophenolphthalein injected into the veins and more recently given by mouth the pathologic gall bladder will throw a shadow on the x-ray plate much dependence was placed on the roentgenologic demonstration of pericholecystic deformities and of gall stones. I have always insisted and still insist that the clinical history and physical examination are the most important elements in diagnosis and that x-ray is valuable as a confirmation of what the clinical behavior indicates. More especially have I stressed the unreliability of negative results of roentgenograms in the presence of what I consider sufficient clinical indications to warrant a diagnosis of cholecystic disease. The visualization of the diseased gall bladder is no doubt a step in advance and a great one but it has its limitations and its diagnostic accuracy is not so great as enthusiasts would have us believe. I am not in any way belittling the method for I consider it a great contribution to our science. My object is mainly to point out two important

facts that must not be lost sight of—the unreliability of negative evidence and the dangers of the administration of the test

We all know that the most satisfactory results of gall bladder surgery are obtained in the cases that present a very clear cut clinical picture and for these we rarely need any confirmatory evidence although a roentgenogram may be of value in demonstrating concomitant disease of the stomach or the duodenum. It is in just these clear cut cases also that the cholecystogram gives unmistakable evidence of gall bladder involvement. But what about the cases when the dye test is negative in the presence of existing cholecystic disease? For example a thickened diseased gall bladder may produce a falsely negative outline or a mottled appearance of the gall bladder may lead to a wrong interpretation. On the other hand how reliable is the cholecystographic data in the case in which the clinical evidence is not clear? We all know the troublesome neurasthenic individual and the role which suggestion plays in the syndrome which he may present. But leaving aside this type of patient experience has already taught us that certain cases of gastric hyperacidity usually associated with duodenal ulcer give positive cholecystographic evidence of gall bladder involvement whereas at operation the gall bladder is found normal. I do not wish unduly to prolong the discussion of this aspect of the subject but I wish to emphasize the point that cholecystography should not be the sole criterion of gall bladder disease but that the clinical history and physical examination still maintain their significance in the diagnosis of chronic cholecystitis.

Now as to the dangers of the dye test. A toxic reaction is not unusual especially when the dye is administered intravenously but this is usually transitory and as a rule is not of serious moment. More serious are the possible effects of the dye on the pancreas and particularly on the liver in the presence of common duct obstruction. This has been recently pointed out by Dick and Wallace of Edinburgh. The death of a robust patient a few hours after the intravenous administration of the dye (5 gm. in 40 c.c. of water) given under the customary careful precautions (and in which consent to post

mortem was not obtained) led the experimenters to do some experimental work in order to ascertain the probable cause of death in their case. Their work showed that (in the cat) the administration of the dye caused an acute pancreatitis while the effects on the liver were manifested in degenerative changes in the cytoplasm leaving the nuclei intact. Calculous obstruction of the common duct as we all know is a condition favorable for the retrojection of bile into the pancreas so that in cases of obstinate jaundice the dye test is distinctly dangerous. I think it important for you to bear this in mind when using the tetraiodophenolphthalein test either intravenously or by mouth. Personally I ask for a cystographic study only in doubtful chronic cases never of course in an acute case nor immediately after the subsidence of an acute attack.

Let me now turn to the clinical diagnosis of cholecystitis. In most instances of the calculous disease the typical attacks of gall stone colic leave little doubt as to the nature of the ailment. But there are quite a number of instances which give a history of colicky attacks of pain but which at operation fail to show the presence of stones.

The most troublesome cases to diagnose are the nervous patients with a certain degree of visceroptosis and colitis. Although in these there are no local signs indicating gall bladder involvement the symptoms are referred to the upper abdomen and are so much like those of a chronic cholecystitis that one must be cautious in committing oneself. Visceroptosis is diagnosable on the clinical history together with the appearance of the patient and the results of fluoroscopic examination demonstrating ptosis of the stomach or the colon or both. For disease of the gall bladder as I have already said cholecystographic study is the latest vogue. But I find that the cholecystographic findings do not always agree with the operative findings so that there is a certain margin of error to be reckoned with. One must therefore not be influenced by the cholecystogram alone. But in the doubtful case where the clinical picture is not clear the test must be carefully considered as contributory evidence. I would compare this to the leukocytosis in acute abdominal

conditions which confirms the diagnosis arrived at by the history inspection palpation and auscultation

The history of a typical case of disease of the gall bladder is too well known to require a detailed description but I shall take a few moments to describe the physical findings. On palpation there usually is more or less tenderness over the site of the gall bladder. This can best be elicited by having the patient take a deep breath with the mouth slightly open and slowly letting it out when at the end of the expiratory effort the tenderness will appear also by making pressure over the site of the gall bladder at the end of deep inspiration and having the patient hold his breath will often show more tenderness than when simply breathing in and out. Sometimes also the fundus is palpable especially in the presence of stones. In such instances the rigidity when present is also more marked than in the non calculous case. In the differential diagnosis the conditions to be ruled out are appendicitis where the appendix occupies a high position duodenal ulcer duodenitis and chronic pancreatitis.

Chronic appendicitis of the type I have mentioned is particularly apt to cause confusion in non calculous cholecystitis. In fact it is almost impossible to make the differentiation clinically. In the calculous case the history of gall stone colic is a good indicator as to the cause of the trouble. Coexistence of the two chronic conditions is as you all know an every day affair most authorities agreeing that the original focus of infection resides in the appendix from which also the duodenum and the stomach may be affected most commonly in the form of peptic ulcer.

In differentiating ulcer and cholecystitis the periodic attacks of gnawing pain in the epigastrium radiating through to the back not around to the back and shoulder blades as in cholecystitis are of value. The cycle of food relief and pain or pain food and relief is decisive. When the gall bladder is also involved there is apt to be a more selective behavior with regard to certain kind of food. The ulcer case reacts to almost all types of food but more particularly to acids while the gall

bladder patient shows greatest intolerance to heavy and greasy foods. The clinical tests are not always of help. This refers especially to hydrochloric acid. It is generally recognized that hyperchlorhydria is typical of duodenal ulcer. As a matter of fact we have found low acidity or anacidity in 22 per cent of our gall bladder cases. It is in the cases that the bile is apt to be infected. In 33 per cent there was hyperchlorhydria which would be strongly suggestive of concomitant duodenal ulcer. Moynihan has recently called attention to the fact that achlorhydria may be responsible for lesions of the appendix which in turn may be the forerunners or perhaps even the cause of infection of the bile as it descends from the liver. The role of the appendix as the primary factor of disease of the upper abdomen more particularly of the gall bladder the duodenum and the stomach is stressed by many others besides Moynihan and myself.

Infection may be carried to the gall bladder by way of the blood stream the lymph channels or by direct extension from any viscus to which the gall bladder may adhere. A nice example of infection by such contiguity was recently observed in this clinic. The illustration I am about to show you will give you a good idea of how this took place. The patient was a man fifty five years of age had been in perfect health with excellent digestion all his life. Five weeks before admission he began to complain of paroxysmal attacks of pain in the epigastrium coming on about two hours after meals and relieved by catharsis (castor oil or Epsom salts). Bowels were markedly constipated and the patient was losing his appetite and losing weight. Stools were normal in color and consistency. A fluoroscopic study of the gastrointestinal tract showed pyloric obstruction the pyloric end of the stomach displaced to the right and some deformity of the duodenal cap. The roentgenologist recommended the dye test. This was given and the reading was defective shadow with dye indicating biliary involvement. The eight hour test meal showed some retention. Free HCl was 82 and total 98. The fractional test meal gave the highest reading of free HCl 64 in the fifth specimen and total

Bowels require a daily cathartic. The patient has been married seventeen years and has one child sixteen years of age.

She has had one operation—hysteropexy and appendectomy—three years ago. Menstrual history is normal. Family history negative for any chronic illness, malignancy, etc. Blood pressure 100/60. Temperature on admission 99.4° F. pulse 88, respiration 20. Weight 104½ pounds. Physical examination generally negative. The abdomen shows no local tenderness over the gall bladder region at this time, although the patient points to that region as the site of tenderness and soreness of which she complains after the attacks subside.

As you see, the clinical history in this patient definitely indicates gall bladder trouble, although the absence of local tenderness at the time of the examination in the hospital is somewhat misleading. Let us see what the dye test shows. Defective shadow obtained with dye, indicating biliary involvement. We can therefore make a tentative diagnosis of chronic cholecystitis, probably calculous.

We have given this patient gas oxygen anesthesia. I make an upper right rectus incision and make it large enough to get a good exposure, which makes for good surgery. Now I'll open the peritoneal cavity and next examine the stomach and the duodenum. They are normal to the touch and in appearance, so I wall them and the intestines off with large sheets of rubber dam and gauze. Next I inspect the gall bladder. It is opaque, somewhat shrunken, and I can detect stone by palpation. There need be no hesitancy in removing the gall bladder because it is already almost functionless. I might incise it and remove the stones and then drain it, but this would not be to the best interest of the patient. We know by this time that among recurrent cases of gall bladder symptoms the majority are those where a cholecystostomy has been done. So we'll take out the organ and give the patient the best chance for a complete cure. First I bring up the liver (Fig 224). This, as you see, in the absence of peribepatic adhesions is best done by gently grasping the right lobe of the liver between the thumb, the index, middle, and ring fingers of the right hand, a thin layer of moist

gauze covering the gloved fingers and by traction upward and outward the gall bladder the under surface of the liver and the free border of the gastrohepatic omentum and the foramen of Winslow are clearly seen by those of you nearest the table and with the introduction of the Cameron light into the wound those of you at a distance are given a good view I next incise the

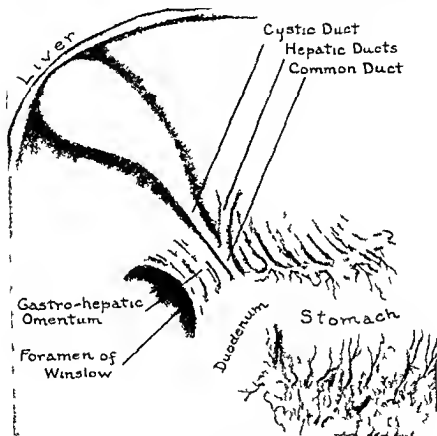


Fig 224—Liver drawn up to show gastrohepatic omentum and foramen of Winslow

free border of the gastrohepatic omentum parallel with the border at about its middle being careful not to injure the common duct or the portal vein and reflect the divided layers of the omentum This exposes the upper portion of the common duct the terminal part of the cystic duct and the terminal portion of the hepatic duct when by lifting the upper leaflet

of the divided omentum still higher I expose the cystic artery which in this instance holds its normal position. This enables me to satisfy myself there are no anomalies and at the same time to divide the cystic duct without a possible chance of injury to the common or the hepatic duct. Only in this way can one be sure of oneself. As you probably know it is at this point that anomalies are apt to occur and unless one has a good view one is apt to make a false step and especially to injure the common duct which would complicate what should be a simple operation. As you see I am not going to start at the fundus of the gall bladder in its removal. Why? For various reasons the principal one being that blood from the denuded surface of the liver will run down and obscure the field and time would be lost in sponging the blood away. We want to work as quickly as possible but only fast enough to do our work well. Occasionally the infundibulum the pelvis of the gall bladder is found adherent to the free border of the gastrohepatic omentum and must be separated in the exposure of the common duct otherwise the latter is most liable to injury. I next clamp the cystic duct at two points close to and distal to the common duct and divide it between the clamp. I also clamp the cystic artery and tie its proximal end to the clamp. Next I dissect the gall bladder from below upward from its bed for a short distance and use it as a tractor to keep the lower end of the gall bladder bed in view. This aids in its closure. The gall bladder having been removed I close the bed by continuous catgut suture and next tie off the cystic duct. If perchance I should wish to circuit the common duct with a probe when there is doubt as to whether or not it contains a small stone I release the clamp on the duct passing the probe through the stump of the duct into and through the common duct into the duodenum. I do not find the common duct distended but nevertheless I will palpate it. By introducing the index and middle fingers of my left hand behind and under as it were the second portion of the duodenum and carrying the thumb in front of the duodenum I would be able to palpate the head of the pancreas and detect a stone were one present in the second and third portions of the duct and with

a probe in the duct I can better differentiate between obstruction inside or outside of the duct. This is a much more satisfactory way of palpating the terminal portion of the duct than by



Fig 225—Liver with hard sharp edge

passing the finger through the foramen of Winslow. Palpation of the first portion of the common duct however is satisfactorily done by carrying the index finger of the right hand into the foramen of Winslow and contacting the thumb with the duct

when with the duct between the finger and the thumb it can be satisfactorily examined. I will complete the removal of the gall bladder. Next I close up the gall bladder fossa by carrying a catgut suture through the liver forming its wall and insert a rubber tube in the subhepatic fossa. This tube will take care of any drainage that may take place within the next ten days. I usually remove the tube on the third or fourth day. Fortunately there is no oozing here. This case has been a clear cut simple one. The patient no doubt will make a smooth recovery and I feel sure will remain well after her operation. Upon opening the gall bladder I find it well filled with stones. I will leave it as much intact as possible so that our artist can make a good drawing of this specimen (Fig. 225). I remove the cystic gland and send it with the gall bladder to the laboratory for study.

Case II—The next patient is a male physician forty nine year old. One year ago he had his first attack of pain in the right hypochondrium lasting about one hour without any radiation to other parts. A second attack occurred several months later and one month ago a third attack. At this time the patient was awakened at night with severe cramp like pain in the right hypochondrium associated with nausea but no vomiting. The pain wore off gradually the patient feeling well during the next day. But at night he was again seized with the cramp like pain which persisted all night and was followed the next day by jaundice although the stools and urine retained their normal color. Since this attack the patient has lost about 7 pounds his present weight being 168 pounds. He felt well between the attacks. Appetite good and bowels regular. His past medical history and family history are unimportant. Physical examination negative except Heart soft systolic murmur at mitral area transmitted to the axilla. Abdomen thick abdominal wall. Edge of liver just palpable. Moderate tenderness more toward midline from the usual gall bladder position. There is some slightly increased resistance in the region of the gall bladder. The various clinical tests give us no infor-

mation being normal or negative Without the aid of the x ray we have made a diagnosis of chronic cholecystitis

The patient is under ether anesthesia to be followed by gas oxygen I make the usual upper right rectus incision open the

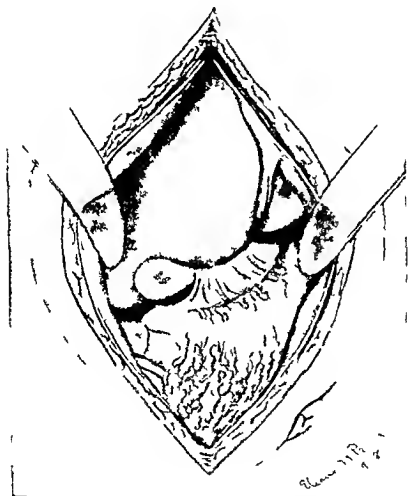


Fig 226—Liver with rounded thickened edge

peritoneum examine the stomach and the duodenum They are all right I now proceed to attack the gall bladder It is surrounded by numerous adhesions which I release and with the usual procedure I remove the gall bladder I find a large stone at the mouth of the cystic duct (Fig 226) This is a beautiful

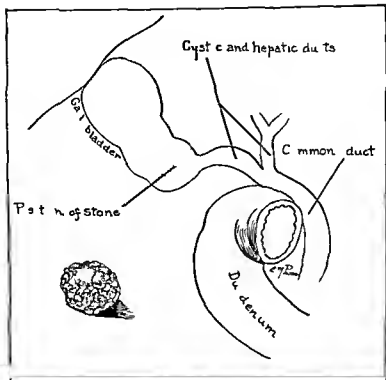


Fig 227—L g gl c l l g ll bl dd t th op g of th yst c
d t (St t l e)

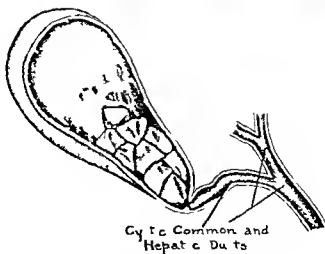


Fig 228—M lt pl calc l th g ll bl dd at th mo th of th cy c
duct (A t l e)

specimen and I shall have a drawing made of it. The gall bladder bile is thick and black. Let us look at the liver again. It shows beginning cirrhosis and some perihepatitis. I should say this patient was operated in the nick of time and will probably feel better than ever after he recovers from the operation.

Case III.—Here we have a young woman thirty years of age giving the following history. Five months ago following a heavy meal developed epigastric fullness, excessive salivation, nausea relieved by induced vomiting. Had persistent soreness in the right upper abdomen for about two weeks after this, especially after meals. Soon after this first attack she developed influenza and was sick for eight weeks. During this illness pin worms were found in the stools and the patient was given santarin. Since then has had frequent shooting pain in epigastrium and right hypochondrium radiating to both shoulders and to the left hypochondrium coming on about one half hour after meals relieved somewhat by belching followed by residual soreness in the right hypochondrium. Has been running an evening temperature of 99 to 99.3 F for past twelve weeks. No history of jaundice. Menstrual history is normal except that during present illness menses have recurred every three weeks. Married twelve years. No pregnancies. Past medical history. Influenzal pneumonia systems otherwise negative. Blood pressure 130/80. Physical examination. Abdomen no definite tenderness over the gall bladder region at this examination. The liver edge is barely palpable on deep inspiration. Right kidney is ptosed. The physical examination otherwise is negative. Blood count normal. Coagulation time forty five seconds. Stools are positive to bile and negative for parasites. Urine shows a faint trace of albumin otherwise normal. The laboratory tests give no information.

There is certainly some focus of infection here while the gall bladder is probably affected there does not seem enough clinical evidence to warrant a tentative diagnosis of cholecystitis alone. There is another condition however which presents just such indefinite symptoms but which is rarely diagnosed because

it is not often thought of. I have reference to chronic pancreatitis. That is the tentative diagnosis made in this case. Now let us see how nearly right we are.

I make the usual right rectus incision, find the stomach and duodenum to be normal. The descending portion of the duodenum, however, is contracted and surrounded by a few adhesions. The liver edge is rounded and somewhat yellowish, indicating cholangitis. As we rotate the liver and inspect the gastrohepatic omentum we find it infiltrated. Now let us look at the pancreas. It is enlarged and hard, giving evidence of chronic inflammation. The spleen is also somewhat enlarged and seems to contain small nodules. The gall bladder is opaque and congested. There certainly is enough pathology here to account for the symptoms and more. I will aspirate the gall bladder and have a smear of the bile made. The bile withdrawn is as you see very dark, almost black, which suggests there is something wrong with the gall bladder. In further examining the gall bladder we see considerable subserous fat. I will examine the cystic gland and the gland at the lower end of the first portion of the common duct, both of which are larger and harder than normal. Examination of the liver shows the right lobe is streaked in appearance and when grasped between thumb and fingers is harder to the touch than normal. Examination of the peripancreatic glands shows them as well as the head of the pancreas to be enlarged. The enlargement is diffused, not confined to one spot and not stony hard. Thus bespeaks a pancreatitis. Stony hardness confined to a comparatively small area, felt in the head of the pancreas, is always suspicious of malignancy, but this cannot always be recognized. Now the best way to treat pancreatitis is to drain it through the common duct by means of a T tube, and that I shall proceed to do. I shall also remove the gall bladder in the usual manner. The report from the laboratory on the smear shows bile to be sterile. Before closing the wound I will insert a rubber tube in the subhepatic fossa.

This patient will have to wear her T tube for several months and I have no doubt is going to be perfectly well before she is a year older.

Case IV—The next patient is a man fifty year old. One year ago he had an attack of right upper abdominal pain radiating to the right scapula. He had numerous attacks since then some of them being followed by jaundice and clay colored stool and persistent soreness in the right upper quadrant for several days. His last attack occurred one week ago jaundice and intense itching of skin persisting on admission. Since his first attack the patient has been on a diet and has lost 55 pounds in weight. Bowels are kept regular with cathartics. Past medical history. Twelve eighteen year ago gonorrhea several times. No recent infection. Blood pressure 110/60 weight 159 pounds. Physical examination. Skin and sclera jaundiced. Heart sound regular quality poor. Sound over mitral area are soft and flapping and there is a soft blowing systolic murmur faintly transmitted to the axilla. Poor muscle tone but no enlargement to percussion. Abdomen. Liver edge is palpable 2.5 cm below the costal margin. In the right upper quadrant there is definite tenderness and rigidity to deep palpation also tenderness in the midepigastrium. Extremities. Reflexes lightly exaggerated especially the patellar. The blood-count however no anemia but the white blood-cells are 10,200 with 68 per cent polymorphonuclears. Blood chemistry. Wackermann plus 3 sugar 90 per cent urea nitrogen 1.5 per cent. Van den Bergh test direct faintly positive (stronger on standing) indirect also positive. Icterus index 2.5 per cent. Cholesterol 175. Hemoclastic crisis. First hour 9:00 white blood-cells second hour 10,000 third hour 8100. Urine brown reaction acid specific gravity 1.003 bile positive microscopically it contains a few granular cast white blood-corpuscles mucus and epithelial cells. Phenolphthalein elimination 33 per cent in three hours. Stool are faintly positive to bile and microscopically contain striated muscle fibers. This patient has been kept under observation for several days and has had intravenous injections of calcium chloride (10 c.c. of a 5 per cent solution) for three days. The jaundice has practically cleared and we feel we can now safely operate. Gas-oxygen anesthesia has been given him. After making the usual incision I find the liver adherent to the anterior parietal

peritoneum. Releasing these adhesions enables me to bring the liver up into the wound in the usual manner. The gall bladder is thickened and contracted. There is a firm mass in the head of the pancreas. Now we know what caused the jaundice. I shall place a T tube in the common duct and remove the gall bladder in the usual manner. Close in the gall bladder fossa and place a rubber tube in the subhepatic fossa and close the wound. It is hard to tell whether the mass in the head of the pancreas is malignant or merely inflammatory. If it is inflammatory the T tube drainage will cause it to disappear.

Cholecystostomy in chronic gall bladder conditions and their sequelæ has a very limited use and rightly so on account of the walls of the gall bladder harboring infection. In all but a comparatively few instances drainage of the gall bladder is only a makeshift in that the patient's future is not protected against the consequences of mural infection which is much more common than infection of the gall bladder mucosa. This is a fact proved by the surgeon who has had large experience in this type of case also by the experimental surgeon in his laboratory.

Cholecystostomy has a place however in the very fat subject and where the operator's experience is not very large. The argument to retain the gall bladder for possible use in future surgical interference should the patient require it is not sound. If cholecystectomy is made at the opportune time future surgical intervention will not be required other things being equal. The same objections hold against cholecystoduodenostomy and cholecystogastrostomy as against external drainage. Furthermore it is a well known fact that neither a cholecystoduodenostomy nor a cholecystogastrostomy remains patulous in the absence of a permanently closed common duct.

It is also well known that where nature establishes internal drainage the new opening caused by ulcerative perforation for example is more permanent than that made by the surgeon. Those of us who have re-operated patients where one or other of the new openings had been made know this to be so. Re-operation following a previous cholecystostomy comprises a fair number of our gall bladder operations. The pathologic findings in

these cases include mucous and biliary fistulas gallstones partial obliteration of the common duct inflammation especially of the head of the pancreas carcinoma of the gall bladder carcinoma of the head of the pancreas cholangitis hepatitis and cirrhosis of the liver

Medical drainage Lyon's method may have some merit as a diagnostic method in a very small percentage of cases. In the long standing case I have never seen a permanent cure by this treatment. In the very early non calculous chronic gall bladder with or without an accompanying cholangitis I see no objection to its trial in fact I often recommend it. But it can be effective only in the catarrhal gall bladder absolutely not in the murally diseased gall bladder. This brings up the question Can the differentiation be made? Personally I think not except by section and bacteriologic examination.

An important feature in the non calculous chronic gall bladder is the occurrence of jaundice. Strange as it may seem many doctors still think jaundice is always an accompaniment of gall bladder disease. I have frequently been asked Why is there not jaundice if there is gall bladder inflammation? In the painful calculous chronic gall bladder jaundice is not uncommon but it is in the non calculous disease that it is of greater moment than in the calculous chronic gall bladder. This naturally raises the question Why? Because in practically all instances it means a pericholangitis or a cholangitis or a subacute inflammation of the head of the pancreas or choledochitis while in the calculous chronic gall bladder jaundice is usually the result of stone in the common duct. In non calculous as well as in calculous chronic cholecystectomy a Van den Bergh test and an icterus index should be obtained not to do so is neglecting the best interests of both doctor and patient.

What bearing has the presence of jaundice in the treatment of either of the two conditions? Jaundice in the non calculous case especially when of long duration in addition to removal of the gall bladder will require drainage of the common duct and chronic pericholangitis or chronic cholangitis cannot be cured in any other way. Furthermore either of the two conditions will

sooner or later lead not only to cirrhosis of the liver but in a percentage of cases to cirrhosis of the head and also of the body of the pancreas. The earlier drainage is established the shorter the time it will have to be kept up. Cases of long standing require continuous drainage for an indefinite time. Again it is the latter type of case that not infrequently calls for reoperation that is further drainage. In my experience the early cases very rarely recur. I have at present a number of patients carrying T tubes in their common ducts varying in time from one to two and three years. This does not speak encouragingly for the medical treatment of chronic cholangitis which include so called medical drainage by way of the duodenum.

This I dare say will not be accepted as orthodox by the gastroenterologists who practice medical drainage nevertheless it is my experience. This brings up the question of cholecystostomy, cholecystogastrostomy and cholecystoduodenostomy and internal drainage versus cholecystectomy and common duct or external drainage. Only experience with these different operative procedures can as I see it settle the question.

There is a good deal of discussion of the relationship between diseases of the gall bladder and subsequent cardiovascular disease. This would be suggested in the next case but personally I believe there is no connection between the two. From the history you will see that hypotension is prevalent in the family of this patient.

Case V—Man forty two years of age. Typhoid fever in 1912. One year later had his first attack of acute pain in the upper right abdomen requiring morphin for relief. Has had frequent attacks since then consisting of headache dull pain under the right costal margin nausea vomiting bilious vomitus. Attacks are followed by soreness in the upper right abdomen. Between attacks suffers from flatulence relieved by bicarbonate of soda. Bowels constipated requiring constant cathartics. Two months ago had a very severe attack relieved by rest in bed for four weeks. Last attack two weeks ago since which the patient has been vomiting bile off and on. A few months after his first

attack of gall bladder symptoms this man was examined for life insurance. At that time albumin was found in the urine and blood pressure has been steadily rising since then. Four years ago it was 260 but with diet was reduced to 175 but always rises during the above attacks. History otherwise unimportant. Total cholecystectomy four years ago. Has lost about 20 pounds in weight since January 1st. Best weight 210 pounds. Average 180. Present weight 158 pounds. Family history. Father died of stroke at seventy-two years. Two brothers are suffering from hypertension. Blood pressure 240/152. Patient is well developed and well nourished and seems anxious about himself. Skin sallow and moist. Physical examination negative except Heart apex beat 12 cm to left of midsternal line slight enlargement to right. Muscle tone fair. First sound blurred second sound is followed by a very short diastolic murmur heard also over the base of the heart. Abdomen Soft and flaccid. Liver enlarged tenderness under right costal margin. Liver edge is firm round and smooth. Spleen enlarged to percussion but cannot be palpated. Tentative diagnosis. Chronic cholecystitis and incomplete common duct obstruction. Hypertension with hepatic congestion. Blood pressure March 9 1928 228/150 March 14 1928 206/140 (left arm).

Careful observation and study forced me to believe the upper abdominal distress and enlargement of the liver might be due to a latent biliary tract condition. My reason for thinking so was the history. Periodic attacks of upper abdominal pain not severe yet the patient was more comfortable when having a small dose of morphin. These attacks of distress were followed by a slight degree of temperature 99 to 99.5 F. There was also present slight moisture of the skin. Leukocytosis following the attack 8000 to 9000. Van den Bergh and icterus index negative. Physical examination showed slight tenderness in the midepigastrium and over the right edge of the liver. Although the outcome of operation does not seem particularly favorable on account of the cardiovascular condition bad urine bad kidneys 98 per cent blood urea etc. I shall nevertheless venture to explore under spinal apothesis anesthesia selected on account of the high blood

pressure Exploration reveals a small contracted embedded gall bladder containing stone and stones in the common duct I excise the gall bladder open the common duct remove two stones and a lot of muddy bile as you see I pass a probe down the common duct but it is arrested at the papilla of Vater the opening of which is contracted I dilate the papilla of Vater with graduated probes and introduce a T tube into the common duct I shall close the wound without examining or removing the appendix

Note ---Following operation there was little reaction bile drainage was free and the urinary output very satisfactory No further epigastric distress The patient is having a smooth convalescence I shall await the ultimate outcome with extraordinary interest

CLINIC OF DRS CHARLES H GRAZIER AND
W BLAIR MOSSER

UNIVERSITY HOSPITAL

MODERN PROBLEMS IN THE SURGICAL TREATMENT
OF TOXIC GOITER

TODAY we would like to discuss and illustrate to you through a group of cases one of the most difficult as well as most interesting surgical problems—the surgical treatment of advanced hyperthyroidism. As you know patients with toxic goiter can usually be divided into two general classes. The first and much the larger group being those in whom the disease is only moderately advanced and in whom thyroidectomy can be performed with practically no operative risk and secondly a much smaller group who present a serious operative hazard either because of co existing complications or more frequently because of dependent complications which can usually be attributed to prolonged thyrotoxicosis. In a general way this group is composed chiefly of

First patients who have suffered from their disease for a long period of time so that when they present themselves for surgical treatment they are malnourished emaciated and often prematurely senile

Second those who as a dependent complication have severe cardiac damage

Third patients who are well past the prime of life when they develop the disease

Finally those patients who have some associated complication such as tuberculosis nephritis or diabetes which adds to the operative risk. Frequently several complications will be present in the same case. Hence when the disease has been of long duration we rather expect to see more or less serious cardiac damage

In considering this group of so called poor surgical risks the first question to be answered is as to whether or not operative treatment is justified. Does operation offer a reasonable expectation of improvement? Can a reasonable degree of rehabilitation be expected? Is the life expectancy increased? Is the percentage of patients benefited overbalanced by the operative mortality? These are the questions which must be answered in considering the serious operative risk. Through prolonged observation of these patients after operation we can definitely state that a reasonable degree of improvement can be expected. Arrest of the disease and avoidance of further damage is sufficient justification for operation. It is surprising however the degree of rehabilitation that is often seen. Patients who are considered as permanently handicapped will often show marked improvement. As a matter of fact we have never seen a patient regardless of the extent of his disease who has not when relieved of hyperthyroidism been definitely improved. As to the mortality—a certain percentage is anticipated but since this is so low as compared to the increased life expectancy—I do not believe it should be considered.

Case I—The patient now before you is fifty years of age. Seven years ago she first developed symptoms of hyperthyroidism and six months later entered a hospital near her home for surgical treatment. She was evidently considered quite ill at that time as the surgeon contented himself with ligation of the superior thyroid arteries as the initial operation. She improved considerably for several months after this operation but disregarded her physician's advice and failed to return for removal of the goiter. After several months she relapsed to her previous state and since then has steadily declined in health. Three years ago she began to suffer from dyspnea, was very easily fatigued and frequently noticed edema of her ankles. These symptoms of cardiac decompensation have progressed until now she is in a stage of moderately advanced decompensation. The heart is dilated. You will notice that the teleoroentgenogram shows an immense cardiac shadow. The valves are incompetent and the

rhythm is totally irregular with an auricular rate of 140. She has therefore a toxic myocarditis with hypertrophy, dilatation and fibrillation—the goiter heart. You will also notice that she is emaciated, is restless and has a marked tremor of the fingers. The basal rate is plus fifty. This case illustrates several things.

1. Concerning ligation. Until six years ago this was considered a routine procedure as a preliminary operation in the very toxic patient. Some and often remarkable improvement occurs for about three months after which, if nothing further is done, the patient gradually relapses until its effect disappears. It therefore was customary to perform thyroidectomy eight weeks subsequent to the ligation. Since the introduction of iodine as a pre-operative measure, ligation has been practically discarded. The remission produced by iodine is so satisfactory and the uncertainty of its effect on subsequent administration so well known that we do not think we should allow the induced remission to pass without taking advantage of it by performing a more radical operation. In this Clinic ligation is now used only occasionally as a trial operation to test the patient's resistance. We have not used it once during the past year.

2. The second interesting feature in this case is the cardiac picture. She is suffering from severe cardiac damage. Whether the goiter heart is produced entirely as a toxic process, as a specific action of the thyrotoxic substance, whether it is mechanical due to constant cardiac stimulation, or whether it is due to a combination of these two circumstances—is still a mooted question. At all events the clinical sequence is that of tachycardia, hypertrophy, dilatation, valvular incompetence, fibrillation, decompensation and finally congestive heart failure. It is to a large extent the degree of cardiac damage that influences the immediate mortality, and it is therefore with the cardiac complication that we are particularly concerned. The occasional mortality now seen is practically always due to cardiac failure. Postoperative crisis—the dreaded complication of a decade ago—is no longer feared. Careful pre-operative preparation has practically erased it as a serious matter and it is now rare indeed that a postoperative crisis is encountered. It is

needless to say that every effort must be made to protect the cardiac mechanism before performing operation. In this we lean heavily on our medical confreres. When serious cardiac damage is demonstrated the patient is placed temporarily in their charge. By prolonged rest and judicious use of digitalis or quinidin an effort is made to stop the fibrillation and produce compensation. This attempt is not always successful so that we are forced in many instances to operate in the presence of fibrillation and decompensation. But until a thorough attempt has been made to restore compensation and as long as the cardiac mechanism is improving we observe a policy of hands off as far as surgery is concerned. It is impossible to lay down any rules as to how long this attempt should last. It is obvious that the time necessary to restore compensation will vary with the individual case. At the expense of repetition I would like again to impress upon you the utter uselessness of digitalis as a means of combating uncomplicated tachycardia. It has no usefulness in this respect and in fact may be distinctly harmful by inciting nausea and vomiting. Now let us return to the case before you.

The patient has of course received iodine as a preliminary measure. We have reached certain conclusions regarding the use of iodine which probably are of interest. While originally advised only as a means of preparing the exophthalmic patient we have now demonstrated to our own satisfaction that a similar improvement occurs in the toxic adenoma as well. In this clinic therefore iodine is given to all patients with toxic goiter for from seven to ten days before operation. It is of course well known that the induced remission produced by iodine is of short duration and should therefore be taken advantage of by performing operation when the maximum improvement has been reached. We do not give iodine postoperatively except during the immediate postoperative reaction. We have never been convinced that its prolonged use after operation is of any benefit.

Having obtained the maximum effect of iodine rest and digitalis what will be the extent of her operation? Of course we all recognize that cure cannot be expected until a subtotal removal of both lobes—if both are involved—is performed. Until

a few years ago we always approached the operation of the thyroidectomy with the thought that the postoperative reaction was directly proportional to the amount of diseased thyroid tissue left in place and therefore when removal of the goiter was begun subtotal resection was always completed unless the patient's condition while on the operating table became so critical as to prevent it. While this was apparently a theoretical and logical conclusion we are now thoroughly convinced that it is a fallacy. When one lobe only is removed the opposite lobe being undisturbed the reaction is less severe and in reviewing some of our earlier fatalities we are convinced that at least some of them would have been prevented had we been contented with removal of only one lobe at the original operation. This operation so called unilateral lobectomy has therefore become a routine procedure and when there is the least doubt that the patient will be able to withstand the complete operation he is always subjected to the two stage procedure. Following removal of the first lobe the patient invariably improves considerably. This improvement continues on the average for about three months after which a slow retrogression occurs until the original degree of toxicity is reached. The second operation is usually performed at the end of eight weeks. With this second stage we are never as greatly concerned as with the original one. We have never had a fatality in the second stage. At the present time about 30 per cent of our operations are carried out by the two stage method. This will be the plan of procedure in the present case.

Case II—The next patient illustrates another type of complication not infrequently seen. For several years he has suffered from pulmonary tuberculosis. One year ago symptoms of thyrotoxicosis developed. You see before you therefore a patient suffering from two diseases both of which produce progressive emaciation and when combined they are extremely serious. The patient weighs 88 pounds. The basal metabolism is plus 64. A Ray of the chest shows a tuberculous process at both apices. Our attitude toward this combined pathology is

governed by the knowledge that we have no specific remedy to deal with pulmonary tuberculosis. It is only by giving the body a chance to combat the pulmonary infection by relieving all other complications that arrest of the process can be expected. It is very necessary therefore that he be relieved of the factor of thyrotoxicosis as soon as possible. Operation is therefore absolutely necessary. In the presence of active pulmonary tuberculosis the question of anesthesia must receive consideration and we recognize this as one of the few contraindications to general anesthesia in performing thyroidectomy. The patient will be operated upon under local anesthesia. As a general rule in uncomplicated cases we much prefer general to local anesthesia. Avoidance of psychic trauma is much more important than the very minimal danger of anesthesia complications. Nitrous oxid is used routinely in this Clinic. Ether while no doubt an easier burden to the damaged heart is never used as many of the patients are so debilitated that bronchitis or pneumonia would be inevitable. We have had no experience with ethylene but on the whole fail to see any advantage in it over nitrous oxid. When local anesthesia is used a very simple method of infiltration is followed. Infiltration along the proposed skin incision until the skin is tense with an additional small amount at the angles of the wound with the needle pointed upward and backward to block the cervical nerves is sufficient. We have never seen the usefulness of many of the complicated methods of infiltration and in fact infiltration of local anesthesia for thyroidectomy is one of the simplest of surgical procedures.

Case III—The next patient first entered the hospital ten weeks ago. At that time she was in an advanced stage of hyperthyroidism with a basal rate of plus 58, constant tachycardia, marked loss of weight and with prominent nervous symptoms. The operation at that time consisted of removal of the right lobe following which she was sent to a convalescent home for six weeks. She now returns for the completion of the operation. During the interval she has improved considerably, has gained 14 pounds in weight, the nervous symptoms are less marked, the

cardiac rate is 100 and the basal metabolism is plus 35. Since the patient was able to withstand removal of a lobe in her original condition she is certainly now in much better hope to withstand removal of the opposite lobe.

Case IV—The next patient is shown to illustrate the end result of the two stage procedure. Lobectomy was performed three months ago and removal of the second lobe two weeks ago. Needless to say the patient went through the second operation much better than the first. His basal rate is now normal and he is on the way to recovery.

The remaining cases illustrate a different problem and they are presented to demonstrate our attitude toward the non toxic goiter. We recognize the following indications for operation on non toxic goiter:

First when pressure symptoms are present

Second when substernal extension exists

Third as a cosmetic operation

Finally and most important as a prophylactic measure in the prevention of toxicity and malignancy.

From statistical evidence it can be assumed that about 20 per cent of all non toxic goiters will become toxic after the age of forty and that 2 per cent will become malignant. To allow toxicity to occur before advising operation is we think a dangerous procedure. This form of thyrotoxicosis so called secondary toxicity or toxicity occurring in an adenomatous goiter often occurs very slowly. The course is insidious and often the patients are not only serious operative risks but may have certain dependent visceral complications which will persist even after the cause of them is removed. As far as malignancy is concerned there is—when the clinical diagnosis of malignancy can be made—no operative indication as visceral metastasis has already occurred. It is our custom therefore to advise operation on non toxic adenomatous goiters if they persist beyond the thirtieth year of life. Our medical colleagues give as another very urgent indication for operation the removal of an apparently innocuous goiter in patients suffering from cardiac

disease their reason being that should these patients develop thyrotoxicosis the additional cardiac damage may be more than the patient can withstand.

Case V — The patient now before you is fifty years of age. He had a goiter for thirty years. For the past three years he has suffered from pressure symptoms, dyspnea and partial aphonia. The x-ray shows a marked substernal extension with deviation of the trachea and encroachment upon its lumen. If untreated the tracheal compression is usually progressive, especially so when there is substernal extension as here the bony thorax will not permit of expansion and consequently the more easily compressible structures are compressed. Serious respiratory difficulty may then occur and in attempting to obtain sufficient ventilation a compensatory emphysema of the lungs occurs. Operation was performed on this patient seven days ago at which time the specimen which will be shown you was removed. You will notice that it is an immense adenomatous goiter, its weight being 50 gm. The operation was done under local anesthesia, respiratory difficulty being one of our chief indications for its use. As is usual when non-toxic goiters are removed, he had no complications and is now up and about in the ward.

Case VI — The next patient who is forty years of age was subjected to operation as a prophylactic measure. She apparently had a non-toxic adenomatous goiter which was slowly increasing in size. It was removed by the usual method but in doing it was noticed that the specimen was extremely firm and friable. A frozen section was therefore made and the pathologist's report was carcinoma. We therefore did a more radical extirpation, removing every vestige of the thyroid tissue leaving only what were considered the parathyroid bodies. She now has a basal metabolism of minus 30 and it will be necessary to give her thyroid extract for the remainder of her life. This of course is of very minor importance. We are showing the case to you in order to point out that recovery from

malignancy of the thyroid gland occurs only when the diagnosis is made by the pathologist. In other words when the specimen found at operation is grossly malignant we do not expect recovery it being a well known fact that carcinoma of the thyroid gland metastasizes through the blood stream and is disseminated widely by the time that the clinical diagnosis can be made. The patient's prognosis is therefore grave. As a routine procedure we always irradiate these patients after operation and as a matter of fact are convinced that the best palliative treatment for malignancy when diagnosed clinically is as radical an operation as can be performed followed by x ray treatment.

CLINIC OF DR. CHARLES F. NASSAU

JEFFERSON HOSPITAL

RADIO KNIFE IN EXTENSIVE MALIGNANT DISEASE OF THE BREAST

THE results of operation for scirrhus carcinoma of the breast even in the most skilled hands are nothing of which to be inordinately proud. If the patient presents herself with a small lump in the breast after having discovered it perhaps a day before and it is still in the state where positive diagnosis is difficult, results are satisfactory or fair but even then not always certain. What breaks the surgeon's heart is to have a patient come in such as Mrs. S. D., aged sixty, who complained of a lump in her breast. Upon questioning her I found that she had known that the growth was present for the past two years and that one year ago she began to have some pain.

At examination I found a markedly retracted nipple with dimpling of the skin over the breast. The tumor in the breast just missed being adherent to the chest wall. The axillary glands were plainly palpable. The supraclavicular glands could not be felt. Urinalysis showed specific gravity 1020, acid reaction with trace of albumin, and the blood sugar was 190 mg.

x Ray of the chest, July 9, 1926. There are densities in the lung fields which would suggest secondary carcinoma; there. Root shadows are thickened to some extent and the linear extensions from them are still intensified. The changes are not, however, characteristic of metastatic carcinomatous involvement. They might readily be due to recurrent attacks of passive congestion or to frequent attacks of bronchitis. A good report but in the end vague and one which did not help me to come to a decision.

I looked upon this woman's condition as hopeless, yet I had a distinct feeling that it might be possible to operate upon her if

a method were used that would minimize the possibility of malignant cell implantation upon clean areas

Operation July 13 1926 Radical breast amputation of the Halsted type The so called radio knife was used throughout The technical portion of the operation was entirely satisfactory and the time consumed was about one half of that usually necessary with knife dissection Only 15 points required the application of ligature There were very large masses of glands in the axillary space and subscapular space and a note was made that the prognosis was extremely bad There was much more oozing than is usual and it was therefore necessary to drain more freely at the operation Her convalescence was a good one but healing of the wound itself was slow although there was no actual suppuration Accumulations of blood and serum formed beneath the flap which had to be partly opened to allow drainage I would say that the convalescence was anything but satisfactory as compared with the usual postoperative recovery of the knife operated patient

Despite these drawbacks she ultimately made a good recovery and returned to her home Owing to circumstances beyond my control she had no x ray treatment either preoperative or postoperative Notwithstanding the very bad prognosis and the extremely extensive character of this growth she was seen by a colleague within the last month who examined her and he states that there is no local recurrence and that apparently she is free from any metastatic growth

It is entirely improbable that the use of the radio knife had anything to do with this freedom from disease except in so far as it may have been a factor in preventing recurrence which may happen as the result of cell implantation Laboratory diagnosis confirmed the clinical observation of scirrhous carcinoma of the breast

We shall welcome the day when women become sufficiently well taught to care for their health by either carefully observing the condition of their breasts or consulting a competent physician from time to time and this at not too great intervals

GALL STONE OBSTRUCTING CHOLECYSTODUODENOSTOMY

A NUMBER of years ago the desire of many surgeons to avoid the operation of cholecystectomy led to some rather curious practices one of which was the performance of cholecystoduodenostomy after the removal of stones from the gall bladder. Evidently an operation of this kind was performed with the idea that it would do away with the complications that arise from the leaving in of the diseased gall bladder by means of constant wide open internal biliary drainage. While it is true that the operation of cholecystoduodenostomy is still a recognized one when done under the proper conditions it is not a wise procedure after the removal of gall stones. In my opinion it is just as bad an operation as the one proposed many years ago by the late Theodor Kocher which he called cholecystendysis a so called ideal cholecystotomy. Except as a theory there was nothing ideal about it at any time and at present when we know so much better what the retention of a diseased gall bladder means in the production of later complications and the continuance of ill health for the patient it is certainly anything but a wise procedure.

There are of course certain conditions under which it is necessary to refrain from performing cholecystectomy. Some of these are so obvious that a discussion of them is unnecessary. I may say however in the main that the more skilled the surgeon becomes the larger number of gall bladders will be removed even when the gall bladders are severely inflamed and thickened and where there may be perhaps impending gangrene. In regard to infection there is no reason why the most seriously ill gall bladder cannot be removed. In certain inflammatory conditions however the fear of being unable to control hemorrhage is about the only reason for prohibiting its removal. Naturally one must be absolutely sure that there are no stones

in the common bile duct. Secondary operations upon the common bile duct for the removal of gall stones may tax the skill and ingenuity of the best trained operators.

Over and above all inflammatory consideration with or without stones the one positive indication for the performance of cholecystoduodenostomy is for the relief of the unendurable jaundice that exists when there is malignant obstruction of the terminal portion of the common bile duct. When the surgeon elects to explore or has the misfortune to chance upon a malignant growth in the head of the pancreas or a neoplastic obstruction of the ampulla of Vater but little is added to the risk of operation by planting the top of the gall bladder in the duodenum. Patients so treated have absolutely perfect comfort as long as the cystic duct remains unobstructed and are freed from the itch which is such a curse and which is otherwise unrelievable. Furthermore it is sometimes impossible for the most skilled diagnostician to tell with 100 per cent accuracy whether a hard head of the pancreas and obstruction of the common duct are due to a malignant growth. I have at the present time two patients, one operated upon three the other four years ago who at that time had intense jaundice and in whom upon exploration I found an apparently stone hard growth in the head of the pancreas. In each of these patients a cholecystoduodenostomy was made. They are both living and in good health and we are now willing to accept a diagnosis of pancreatitis or even the possibility of an overlooked stone in the duct. Nevertheless they are comfortable and well and the operation fulfilled its objective.

Mrs M. K. fifty years of age was admitted to the hospital complaining of epigastric pain, nausea and belching of gas. Her family history bore no relation to her condition. The present illness began at the age of forty with indigestion and severe pain starting in the epigastrium and radiating to the right scapular region. Jaundice was present. She was operated upon by a competent surgeon and according to her statement the gall bladder was drained and three large stones removed. I doubt the drainage of the gall bladder. I presume that she had

merely in abdominal drain because it was removed after a few days. It is a fact however that at that time a cholecystoduodenostomy was done. She was much improved for nearly six years when she had another attack of pain, nausea and jaundice, no actual vomiting, no typical attacks of biliary colic with the classical referred pain since her operation.

On admission to the hospital this time she had normal urine, red cell count 3,360,000, 6000 leukocytes, hemoglobin 65 per cent, blood coagulation time six minutes. Her mucous membranes confirmed the laboratory report on the hemoglobin, she was frankly anemic. Patient's skin was a muddy color and she had lost a great deal of weight. Graham study showed that she had apparently one stone in the fundus of the gall bladder. The gall bladder region was extremely painful on light palpation. Nothing definite could be felt.

Operation March 21, 1928. Incision 4 inches in length was made extending through the old scar and above and below it through the upper right rectus muscle. After the abdominal cavity was entered in an area free from adhesions investigation disclosed that the gall bladder had been anastomosed to the duodenum. In this anastomosis blocking it completely with the fundus of the gall bladder closely adherent to it, there was a stone 2 cm. in diameter occluding the opening between the duodenum and the gall bladder. The cavity of the somewhat shrunken, thick-walled, tube-like gall bladder contained a considerable quantity of biliary mud. The anastomosis was released and the duodenum closed in two layers, the first being a continuous suture of fine chromic catgut and the second the peritoneal infolding layer of interrupted mattress-sutures of fine silk. The gall bladder was then removed in the usual way. The stump of the cystic duct was split and a lead probe was passed without any difficulty down through the ampulla of Vater, proving that the common duct was patulous. A dressed rubber drain was fastened with one fine gut suture to the stump of the cystic duct. This was then surrounded by iodoform gauze drains outside of which was placed a sheet of rubber dam. The tube was fastened to the skin at the upper angle of the

RADICAL CURE OF INCISIONAL HERNIA

DESPITE the care exercised by surgeons in the suture of abdominal wounds we have with us always patients who develop incisional hernias even when the wounds have apparently healed by first intention. Lahey of Boston recently called attention to the failure of proper wound healing in the etiology of incisional hernia. Many of these hernias are due to inefficient methods of suturing. However in patients who have had large drainage introduced one may reasonably expect the development of hernias in at least 30 per cent of cases and no surgeon can be censured therefor. I believe that the percentage of post operative hernias is larger where a straight incision through the rectus muscle was made than when the muscle splitting incision has been employed.

I want to instance the case of Dr. C. L. of South Carolina thirty nine years of age who was admitted to Jefferson Hospital on October 27, 1922. He stated that he had been operated upon in South Carolina in 1921 for appendicitis. Following the operation he had a stormy convalescence with much nausea and vomiting and he believes that his hernia was the direct result of this as there was an outstanding bulge in the wound before he left the hospital. It was then small and has gradually increased in size until at the time of his admission to the hospital there was a large bulge approximately 7 cm. in length and 4 cm. in width under the skin incision in the right iliac region. The patient had worn an abdominal support since leaving the hospital after his appendectomy. His general physical condition was good, chest and heart were negative. The actual size of the hernial opening was about 4 cm. in diameter. The hernia was reducible. The original abdominal incision was of the muscle splitting type.

Operation October 28, 1922. Gas anesthesia. Operation scar was excised and all scar tissue resected as far as possible in

order to obtain clean muscle edges. The peritoneum was closed with fine chromic catgut. The remains of the internal oblique muscle were sutured together over the peritoneal line. The external oblique aponeurosis was overlapped with one layer of mattress sutures and one layer of interrupted sutures.

At this time I wish to point out what I believe to be the greatest essential factor in the radical cure of incisional hernia whether it be a hernia through the flat muscles or one through a straight abdominal incision. This is the introduction of mattress sutures of heavy silk which enter from 4 to 7 cm distance from the edge of the wound according to the thickness of the abdominal wall. These sutures dip almost at once as far as the peritoneum and emerge upon the opposite side of the wound to a point approximating in distance the point of entrance. The suture is then returned thus making a mattress suture. The span of the mattress suture across the skin should never be shorter than 1 $\frac{1}{2}$ to 3 cm. A large firmly rolled piece of iodoform gauze is slipped through a loop of this mattress suture in order to avoid injurious pressure upon the skin. The free ends of the suture are then tied over another roll of gauze the tension being so estimated that all of the layers of the abdominal wall that can be utilized in the closure of the hernial opening whether by direct suture or by overlapping can be placed so that they remain without the slightest tension upon any buried stitch. The mattress suture anywhere from 1 to 3 in number according to the length of the incision may be held under tension by an assistant for a time before being tied. This makes a little easier the placing of the large number of buried approximating sutures. Continuous buried sutures should never be used except in the closure of the peritoneal layer.

The wound in such operation has the appearance of a large ridge as the tissues are really somewhat humped up. Unless the skin suture are put in with meticulous care there will be a great deal of dead space. After the obliteration of the dead space as far as possible by means of partly deep and partly superficial suture to insure the safety of the wound it is wise to put in a number of wick drains. The gauze used for dressing

should be fluffed up and so placed in between the iodoform rolls that the surface is filled up level and the superimposed dressings will then make equal pressure over the whole wound area. The skin and subcutaneous drainage may be removed at any time after seventy two hour. The skin sutures are usually allowed to stay for twelve to fourteen days. It is wise to keep the patient with such a hernia in bed and as quiet as can be for twenty one days even longer is wise if the patient is fat. In this instance the heavy silk mattress sutures were removed on the fourteenth day and the patient remained in bed for the full three weeks.

A recent communication November 1927 from the patient's brother who is also a physician states that the patient's abdominal wall is solid and shows no evidence of any bulge. This patient has never worn an abdominal belt of any kind since leaving Jefferson Hospital.

GENERAL SURGICAL CLINIC OF DR W WAYNE BABCOCK

SAMARITAN HOSPITAL

DECEREBRATE RIGIDITY FROM CEREBRAL INJURY

THAT spasm of the voluntary muscles follows the removal of the brain of the living animal has long been recognized in the physiologic laboratory. That a similar condition may follow accidental injury to the base of the brain has not been widely appreciated in the surgical clinic. In the experimental animal, with the removal of successive slices of brain muscular rigidity does not appear until the level of the thalamus is reached.

In a number of diseases characterized by muscular rigidity tremor choreiform movements (Huntington's and Sydenham's chorea) and athetosis lesions of the thalamus the striatum the closely related subthalamie structures and especially that portion of the pons known as the tegmentum have been found. In paralysis agitans and post encephalitic parkinsonismus the lesions in the tegmentum have involved the nucleus ruber the rubrospinal fasciculus and the substantia nigra. These basal structures are exposed to injury and pressure in fractures of the posterior fossa of the skull. Particularly may the midbrain be damaged when the momentum of the moving head is arrested suddenly and the inertia of the after coming body drives in the base of the skull. With a ring fracture the margins of the foramen magnum may be driven into the skull against the brain. Other lines of fracture involving the posterior fossa may also be associated with contusion of the pons and adjacent structures. It is important to remember that muscular spasm and rigidity may immediately follow such an injury and resemble that observed in the decerebrate animal. As would be expected from

its contiguous situation symptoms of medullary injury are often associated

In the present case Fred M a large heavily muscled young man of nineteen while playing football on October 27 1927 dove into a scrimmage and immediately afterward was found lying unconscious on the ground As he was picked up and carried from the field it was noticed that his body was stiff and rigid in marked contrast with the usual limp and relaxed



Fg 229—Ill t t g th po f th m db t j y f
t f th po t fossa f th l ll th th po bl p d t f d
e b t type f g d ty

condition of a person unconscious from injury As he could not be aroused he was brought to the Samaritan Hospital where I later saw him with Dr John Leedom His relatives stated that he had enjoyed excellent health except for a recent attack of influenza from which he had not fully recovered From the nature of the football play doubt was expressed by observers as to any serious injury of the head There were no marks of injury upon the head or body The patient lay upon his back

unconscious and spastic the skin was hot and red the arms held in rigid contraction the legs rigid Occasionally a generalized clonic tremor shook the body or a tonic spasm caused the back to arch into opisthotonos The sphincters were relaxed with involuntary defecation There was rolling of the eyes the right pupil was dilated and immobile the left was held contracted by an old synechia The deep reflexes were exaggerated The pulse varied greatly in volume and in rate from 60 to 180 beats per minute The respiration was very irregular ranging from 35 to 80 per minute Thus serious medullary involvement was suggested The axillary temperature was 101 F on admission three hours later the rectal temperature was 107 F Directly after admission there was a brief period of muscular relaxation Two hours after admission the rigidity persisted the heart was irregular the breathing stertorous the skin cyanotic and covered by perspiration the systolic blood pressure had fallen from 130 to 100 mm of mercury the diastolic had increased from 60 to 73 The patient's body continued to be shaken by violent muscular tremors especially the right side of the face and the right arm Spinal puncture was almost impossible on account of the involuntary movements of the patient A cisterna magna puncture showed very bloody fluid with an excess of small lymphocyte A roentgenographic study of the head—imperfect and made with difficulty—was negative To prevent pressure upon the base of the brain traction was applied to the head Twenty five hours after admission the patient died A necropsy was not permitted

Comment—Attention is called to the serious prognostic import of generalized rigidity with unconsciousness after an injury to the head The condition is analogous to the decerebrate rigidity seen in lower animals and suggests an interruption of conduction in the midbrain or in closely related structures that is not compatible with the continuance of life The rigidity is often associated with marked change in the pulse and respiration indicating a coincident injury to the medulla Cataleptic and related conditions with stiffness of the voluntary muscles such as occurs from hysteria are to be differentiated from a decerebrate

rigidity from cranial injury. Should there be any doubt as to the diagnosis a cisterna magna or spinal puncture will usually show the presence of bloody cerebrospinal fluid if the rigidity is due to a fracture of the skull. Obviously the prognosis will be better if the rigidity does not appear at once but after a free interval indicating secondary pressure from hemorrhage edema or inflammatory exudate. In these cases decompressive measures including repeated cisterna or spinal punctures osmotherapy with hypertonic solutions by mouth bowel (magnesium sulphate) or veins (sodium chloride) are to be used. In injury of or pressure upon the medulla characterized chiefly by apnea it is to be remembered that life has been saved by artificial respiration continued at times for one two or more days.

LARGE ENCAPSULATED MENINGIOMA INVADING THE PARIETAL LOBE OF THE BRAIN

THE patient Mrs Anna B age nineteen housewife was referred to the Samaritan Hospital by Dr Henry Groff for occipital headache vomiting partial hemiplegia and loss of vision on November 7 1927 The occipital headache was severe had been present over two and one half years and

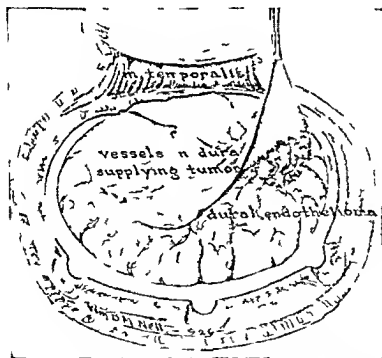


Fig 230 —D on of dura exposing dural or n of large meningioma (endothelioma) n ading the par etal lobe

possibly had followed an injury to the head It had been most intense between two A M and noon For one year the patient had had frequent attacks of vomiting without nausea at times of a projectile character There was vertigo and weakness of the right half of the body The patient was bedfast

and showed mental dulness and hebetude. The neurologic examination was made by Drs. Bochrach and Silverstein who found weakness of the facial muscles on the right side, protrusion of the tongue to the right, a spastic palsy of the lower right forearm and hand and weakness of the right leg. The right patellar reflex was diminished and a right sided Babinski reaction and ankle clonus were present. There was wasting of



Fig. 31—M. g. m. li. m. diam. t. li. d. t. f. th. l. g.
 ca. sty. th. p. t. li. b. b. g. t. l. t. t. p. th. tt. h. dd. l. m. g.
 A. ped. l. t. d. t. f. m. th. t. m. h. h. w. t. mm.
 d. f. t. f. d. t. d. f. ll. w. d. by. l. b. t. t. dg. wth. f. th.
 t. m. R. do. t. f. ll. wth. m. pl. t. m. l. f. th. typ. f. b.
 t. m.

the interosseus of the right hand with weakness of the extensors and flexors of the wrist. The reflexes of the right arm were exaggerated and the patient could not bring the finger to the nose. There was a right sided astereognosis; the sense of position was good and no change in pain, tactile or thermic sense was noted. The urine showed no abnormality; the leukocytosis was 9900; the blood Wassermann was negative; the spinal fluid contained but 2 cells per cubic millimeter and gave a nega-

tive reaction for globulin. A Roentgen examination of the skull was negative. The examination of the eyes by Dr. Peter and Boehringer revealed no weakness of the extra ocular muscles. The right pupil had a diameter of 4 mm, the left of $3\frac{1}{2}$ mm, and the pupils reacted normally to light and accommodation. The right eye showed marked papilloedema with a choked disk of 5 diopters, the left eye optic atrophy, a postsclerotic atrophy and a choked disk of 1 diopter with residual swelling. After the examinations the patient left the hospital but was re-admitted unimproved November 20, 1927 and transferred to the surgical service for decompressive operation with a diagnosis of subcortical and probably inoperable tumor. The diagnosis of a subcortical tumor was based upon the wide spread palsy and marked pressure symptoms with the absence of convulsion or other evidence of cortical irritation.

Operation November 25, 1927. A right subtemporal decompression was started by an incision parallel with the fibers of the temporal muscle. As a section of the skull was removed a thickened area of dura about 4 cm in diameter was found marking the dural origin of a large firm encapsulated tumor which extended deeply into the parietal lobe. The dura was divided at a distance of 2 or 3 cm from its attachment to the tumor, the external opening through the scalp, skull and dura enlarged and by gentle persistent traction on the dural attachment the tumor measuring 11 cm in diameter was rolled out of its bed in the brain. A single pial attachment containing a small artery required division and ligation. The very large cavity left in the brain extended nearly to the midline. The overlying muscle, galea and the scalp were carefully closed in layers without drainage or the use of solution in the cavity. The operation was conducted under local anesthesia by 120 cc of 1 per cent procain adrenalin solution preceded by a hypodermic injection of morphin sulphate grain $\frac{1}{4}$. The patient remained conscious and did not complain of pain. The pulse during the operation was 120 and at the completion of the operation had increased to 140 but three hours after the operation it dropped to 88 per minute. Shortly after the operation the

patient found she had regained the ability to raise the right arm. Three days after operation the Babinski reaction had disappeared from the right great toe and there was a return of the power of flexion and extension of the right hand. Six days after operation the patient was able to write her name but the asteriognosis was still present. The right eye showed good vision with a recess of 2¹ diopters the left eye light perception only. There was no headache or vomiting after the operation and the patient was discharged twenty four days later with nearly complete return of function except for the vision in the right eye which however had shown some improvement. You will observe the present very slight residual disability.

Comment—An unusually large encapsulated meningeal tumor producing typical intracranial pressure symptoms without convulsions very easily lifted out of the enormous cavity it had produced in the brain by traction on the dura. The effectiveness and hemostatic value of a local anesthetic freely injected into the scalp and galea for extensive intracranial operations is illustrated. The access given by a simple straight coronal incision for even a very extensive craniotomy is shown. The absence of convulsions with motor palsy is explained by an initial invasion of the parietal lobe and secondary pressure upon the motor tracts from an area caudal and medial to the motor cortex. Meningioma constitute one eighth of all brain tumors grow slowly causing progressively increasing intracranial pressure over a period of several years are well encapsulated and usually are easily removed except when growing from the optic tracts. They are rarely found below the tentorium. An associated vascularity often gives the surgeon much more trouble than in this case. The prognosis after extirpation of tumors of this type is excellent provided all of the tumor has been removed. Operation should not be delayed until optic atrophy has occurred.

SKIN GRAFTING UPON DRY BONE

FOR living bone exposed in a wound that cannot at once be covered by the adjacent soft tissues it is customary to wait weeks or months before skin grafting is attempted until the outer layer of the bone has exfoliated or until the bone has been covered by granulations. During the delay the bone is exposed to infection and an osteitis develops. With

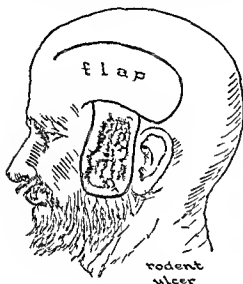


Fig 232

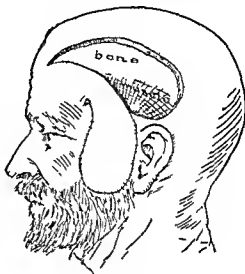


Fig 233

Fig 232 —Skin grafting upon dry bone. Excision of a rodent ulcer of the left cheek has been started and a flap outlined upon the scalp to fill the defect.

Fig 233 —Skin grafting upon dry bone (continued). The rodent ulcer has been excised and a flap from the scalp rotated to fill the defect, leaving exposed skull and temporal muscle.

clean vascular bone (especially with the skull) immediate skin grafting without waiting for granulations to form may be successful. Even though the surface of bone has been dried through several days exposure to the air, grafts may be used. It is important, however, to remove with a sharp chisel sufficient of the outer layer of the bone to expose multiple fine points of

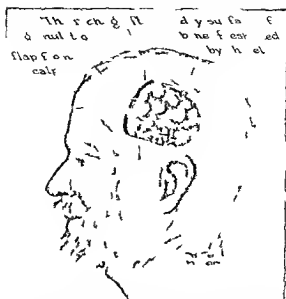


Fig 234—Sk g ft g po lry b (t d) Th ped l fth
fl p f mth calpd d l tth d ft d y nd ret nd t t g l
po t Th f e fth p d d dry k ll m ed b ery t p
h l tl t bl d g po t pp h Th r hg fta k fom
th thgh ppl d d tly to th t



F 3 —k g ft g po d y t (c e l d d d) Show gth d ud d
bo t l d b Th hg lt dth at fct ry c sm t lt
The h th t pl t d f p f mth k ll b l nd w th th t f th be d

bleeding I first discovered the feasibility of such grafting in the following case of rodent ulcer

Mr F E S in 1905 and when about fifty nine years of age cut his cheek in front of the left ear while shaving. A chronic and very persistent ulcer followed which was treated for many months by Roentgen therapy. In 1912 as the ulcer had increased in size a caustic paste was applied. In 1913 the ulcerated tissue was excised and the defect closed by a plastic operation. After transient healing the ulcer recurred in 1915. Marsden's caustic paste was applied in 1916 and 1917. In 1918 the rodent ulcer again was active and the actual cautery was used without any permanent effect on the basal cell epithelioma. In 1920 the violet ray was used. In September 1925 the patient was admitted to this hospital and I freely excised the ulcerated area and swung down a flap from the scalp to cover the defect in the cheek. About ten days later the pedicle of the flap was divided and returned to its former position. The dry exposed surface of the skull was then removed by a sharp chisel until points of hemorrhage appeared. Small Thiersch grafts taken from the patient's thigh were then applied to the denuded bone. These grafts protected by narrow strip of gutta-percha tissue promptly united with the bone which was soon completely covered (Fig 235). Later it was found that the rodent ulcer was growing in the deeper part of the auditory meatus. The ulcer progressed despite the use of radium and caused the death of the patient something over a year after the plastic operation. The grafts however continued to give a very satisfactory covering for the skull up to the time of the patient's death.

PALLIATIVE TRANSPLANTATION OF THE BREAST IN CANCER

THE newer methods of treating cancer have not proved to be an unmixed blessing. Often they have brought a fleeting hope and increased misery. For one retrogression from the

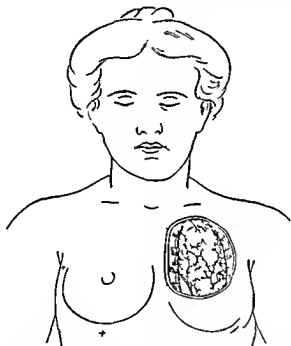


Fig. 236.—Transplantation of the right breast with resection of the wall of the thorax for a very painful malignant and Roentgen ulcer following amputation of the left mammary gland for carcinoma. The ulcerated area has been sterilized by zinc chloride and excised with the underlying involved ribs showing the lung and pericardium. The incision for mobilization of the right breast is outlined.

mixed toxins there have been over fifty of violent chills and fever. For one improvement from colloidal lead, ten patients have been brought close to death by plumbism. With the use of sera and animal proteids have come deaths from anaphylaxis. For one

patient relieved by fulguration a number have had larger more painful malignant ulcers. For a hope of benefit from radium and Roentgen ray many afflicted with malignant disease have paid a heavy price. Often the agony of carcinoma is first brought to the patient by the radiation. We may well balance the intense suffering from neuritis dermatitis ulceration the stimulation of malignant disease the degeneration of organs and ductless

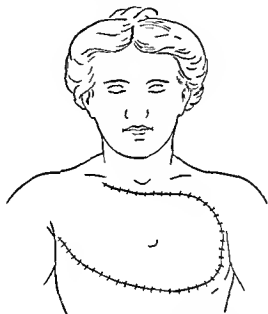


Fig 237—T. pl. t. t. f. b. t. (t. n. d). Th. d. f. t. th. l. ft.
t. th. l. h. be. d. by. t. a. pl. t. g. th. r. ght. b. t.
With c. t. h. m. t. d. ag. wa. q. d.

gland the anemia and asthenia due to the radiation against the benefits received. The lives of many patients with malignant disease would have been longer and happier had no aggressive treatment been used. We should not abandon the newer methods but we should use them wisely and with discrimination. Useless and unnecessary radiation is as reprehensible as a useless operation. Indeed of the two the knife is the more merciful rarely does it bring a new source of persistent pain to the patient.

In any case it should be remembered that a malignant growth covered by skin is better than a fungating malignant ulcer. Any treatment which converts a closed and relatively painless cancer into an open more repulsive and especially more painful one should be avoided. If there is an open painful sore it may be wise to operate to cover the opening. If there are deep seated growths that cannot be eradicated the patient should not be



Fig 238 —Transplantation of breast (concluded) The bunched and ulcerated area has been completely covered permitting the resumption of radiation treatments. The heart may be palpated through the opening in the bony wall of the thorax. The excellent nutrition of the patient which followed the operation and which continued for about six years despite the presence of metastatic growths is shown.

punished in the effort to apply a useless treatment for a hopeless disease. In the following case the patient suffered from a Roentgen burn exacerbated by the use of the actual cautery. Although the outlook was hopeless due to the presence of deep seated metastatic growths by eliminating the ulcer the patient was enabled to live on in relative comfort for four and one half years.

Yetta F. married two children had the left mammary

gland removed for carcinoma at the age of thirty. Recurrence in the mediastinum and thoracic wall followed for which the patient was given Roentgen treatment for three years or until a very painful radiation burn developed in the skin. After suffering for three months the burned and carcinomatous area was deeply destroyed by the actual cautery. This resulted in a larger deeper and much more painful ulcer. Ten weeks after the cauterization when I first saw the patient she was emaciated and in deplorable condition from the constant pain and loss of sleep. At the site of the left breast was an exceedingly painful and necrotic ulcer about 9 cm in diameter exposing the ribs and surrounded by a wide zone of atrophic and fibrotic skin with telangiectases from radiation. It was evident that the local conditions were not favorable for the healing of the ulcer. Under anesthesia the ulcerated surface was therefore cauterized and deeply disinfected by the application of a saturated solution of zinc chlorid and a section of the entire thickness of the chest wall including the ulcerated area the adjacent fibrotic skin and the underlying ribs and pleura was excised. The excision produced a large window in the left thorax exposing the lung and pericardium. To cover this large opening the remaining mammary gland was mobilized swung down and to the left and sutured over the defect. No pleural infection followed the pain was relieved and the patient gained greatly in weight and strength. Later it was possible to resume the radiation treatment of the thorax through the transplanted skin and mammary gland. The heart could be palpated and partially grasped through the defect in the thoracic wall. The patient had over four years of relative comfort from the transplantation finally dying from internal metastases about nine years from the time internal metastases were first recognized. The restraint of the malignant growth may be attributed largely to the pain taking radiation treatment of Dr. George H. Pfahler.

Comment.—In primary amputation of the breast for malignant disease the opposite breast has been transplanted to fill the cutaneous defect. The value of transplantation of a mammary gland is here shown in recurrent carcinoma to overcome a

very painful ulceration. The usefulness of the transplantation is here shown for defects involving the entire thickness of the thoracic wall. Attention is again called to the effectiveness of zinc chlorid for depth disinfection of necrotic ulcers. A method of overcoming the pain of an ulcer of the skin from malignancy radiotherapy or cauterization is given. The transplantation of the opposite breast enables the resumption or continuance of roentgenotherapy irrespective of the previous injury to the skin.

THE VAGINAL APPROACH TO THE PERITONEUM

THE surgeon who operates within the abdomen should be familiar with the indications for and the technic of vaginal section. At times the cul de sac incision is life saving. In skilled hands the ligation or clamping of the bleeding tube in ectopic pregnancy is not only quicker but much safer when performed through the vagina. As a rule it is also safer to drain ectopic accumulations in the pelvis through the vagina than through the abdominal wall. Occasionally unusual abdominal complication arise best handled by a vaginal section.

Vaginal Enterostomy—Many surgeons after an abdominal operation have had the trying experience of having intestinal adhesions re form in the pelvis with the production of an acute ileus. Not infrequently it has happened that if the abdomen is reopened and the adhesions again separated the relief is but temporary. If there is good reason to believe that the obstruction is in the pelvis an exploration from below may be considered. Should an abdominal incision be made the greatly distended intestinal coils press out of the abdomen are controlled with difficulty and exploration for the cause of the obstruction is usually attended by partial evisceration and undue traumatism while the closure of the abdominal wound over the distended loops of bowel is not only difficult and trying for the surgeon but may have a disastrous effect upon the patient. In such a case I have seen a distended loop of bowel burst as the hands of an assistant tried to hold it within the abdomen flooding the field with foul intestinal contents. If the ileus is due to a pelvic peritonitis the most satisfactory drainage is usually obtained through the vagina. The cul de sac incision enables the exploration of the pelvic peritoneum the localization of a distended and obstructed loop of intestine and the fastening of a small rectal tube into the distended bowel by a purse string suture of chromicized catgut. The operation as with most vaginal opera-

tions causes little shock and for the properly selected condition gives immediate relief to the obstructive symptoms.

The patient Mrs S J age thirty six is presented nearly a year after such an operation. She came to the hospital for relief from severe colicky pains in the lower abdomen from which she had suffered for four years. The pains were increased by movement and were relieved by rest. She was a frail thin

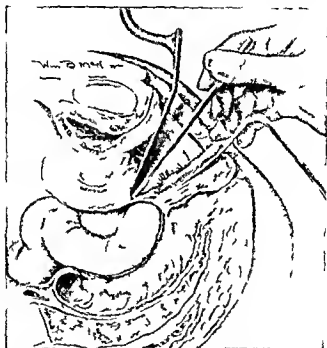


Fig 239—Vaginal hysterectomy. Patient with myoma removed through the vagina.

woman apparently of limited resistance. The abdomen was opened through a Pfannenstiel incision on March 3, 1921, after a preliminary dilatation and curettage. Dense pelvic adhesions binding down the uterus, tubes and ovaries were separated; adherent omentum was liberated; the right fallopian tube and the vermiform appendix removed and the left ovary resected. The uterus was not enlarged but was retroverted and densely ad-

herent. The operation was completed by an intra abdominal shortening of the round ligaments and the wound closed without drainage.

For five days after the operation the postoperative course was uneventful. On the evening of the fifth day the patient complained of abdominal cramps. The following day the pains were more severe and the patient vomited but the abdomen was not rigid or distended. The next day a large amount of yellowish



Fig 240—Vaginal enterostomy (continued). Rubber tube being fastened in distended loop of intestine by inverting peritoneal suture. Protective gauze in pelvis is partially shown.

fluid was vomited, the cramps continued and enemas were expelled with only slight fecal staining. The day after this, or the eighth day after the operation, the vomiting persisted, was yellowish, very offensive and of the intestinal type. The patient was very weak, the abdomen was markedly distended, the temperature was 101.3 F and the pulse 100. By vaginal examination the elastic tension from marked intestinal distention was felt through the cul de sac.

An emergency operation was immediately started with a diagnosis of ileus from pelvic adhesions. As I felt that there was greater danger in exploring the pelvis from above a transverse incision was made behind the cervix evacuating bloody serum. A greatly distended loop of small intestine presented which was isolated by gauze packing and a small rectal tube fastened into the gut by two purse string sutures of chromic catgut. The tube was brought out through the vagina and with the adjacent part of the loop of bowel was isolated from contiguous structures by iodoform gauze. No attempt was made to close the vaginal opening. After the operation quantities of gas and liquid intestinal contents escaped through the tube giving the patient almost immediate relief. The tube came away on the fifth day and the gauze drains were withdrawn some days later. Spontaneous evacuations through the rectum soon occurred and the vaginal enterostomy opening had practically closed when the patient was discharged twenty days after the operation. In the year that has since elapsed there has been no return of obstruction. The vaginal vault is smooth and free from leakage. The operation is not presented as a routine procedure but as an expedient to be selected with judgment in meeting a special type of ileus with the seat of the obstruction in the pelvis.

Vaginal Appendectomy—An appendiceal abscess occupying the pelvis or an inflamed appendix extending below the ileo-pectineal line may occasionally be effectively and safely reached through a vaginal incision. Obviously, the operation is easier to do in the multiparous woman. The patient is placed in the lithotomy position with the hips well elevated, a free incision made through the posterior cul de sac and the pelvis inspected by the aid of long retractors and trowels. The inflamed appendix is grasped by a ring ended towel forceps pulled down into the vaginal incision, the base doubly ligated with No. 0 chromic catgut and the appendix removed with division and ligation of the meso-appendix. A strip of gauze or a cigarette drain is introduced to the stump of the appendix and is withdrawn after four or five days. In all I have removed

the appendix through the vagina about fifteen times usually however not for acute inflammation but in conjunction with other cul de sac operations. In the following case an unexpected chronic perforation of the appendix was found.

Vaginal Appendectomy and Ovariectomy—Mrs. Louis O. age thirty six entered the Samaritan Hospital November 27 1927 complaining of fulness and a bearing down sensation felt in the vagina for one year. A vaginal pruritis with discharge had been present for nine years or since her one pregnancy. For four years she had also been subject to a chronic arthritis partially relieved after the extraction of teeth the removal of nasal polyps and the opening and drainage of nasal sinuses. A cystic mass the size of a peach was felt to the left of the uterus and a marked bilateral laceration and erosion of the cervix and a cystocele were present. The day after admission under spinal anesthesia the uterus was curetted an Emmett trachelorrhaphy performed and the posterior vaginal fornix opened by a transverse incision immediately behind the cervix. A thin walled unilocular cyst of the left ovary about 8 cm. in diameter was exposed which was evacuated and removed through the vagina with the adjacent adherent portion of the left fallopian tube. On carrying the uterus forward by the vaginal trowel a very infiltrated and adherent vermiform appendix was observed at the brim of the pelvis partially bound down under the cecum. The appendix was grasped by ring ended sponge forceps and gradually pulled down into the vaginal vault as the adhesions and the meso appendix were clamped and divided. Near the base of the appendix an old perforation walled off by adhesions was found. The appendix was doubly ligated by chromic catgut close to the cecum divided through the vagina by an electric cautery and removed. The meso appendix was ligated in sections over the stump of the appendix and a small Mikulicz drain of iodoform and plain gauze introduced into the vagina and lower pelvis. The gauze was removed on the fifth day. Except for a postoperative headache the convalescence has been free from untoward symptoms.

Vaginal Ureterocystostomy—The operation of vaginal ap

pendectomy just presented recalls a very simple method of anastomosis between the urinary bladder and ureter which may be accomplished through the vagina. The operation I devised many years ago for a woman with an obstruction of the left ureter close to the bladder wall. The thickened distended ureter which was palpable through the vagina was exposed by an

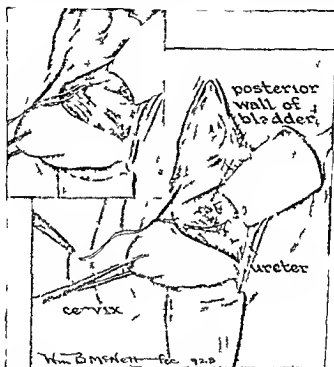


Fig. 241.—Vaginal cystostomy by ligating distended ureter exposed through vagina. Ligament tied to bladder wall. Inserted ligature.

incision in the left lateral vaginal vault. The ureter was transfixed in a vertical direction by a strong silk thread carried upon a full curved needle. A contiguous portion of the bladder wall was then transfixed in the same manner by the needle and thread and the ligature tied very tightly. The bight of the thread which included both the wall of the ureter and that of

the bladder was about 12 mm long. A probe was next introduced into the bladder through the urethra and pushed through the bladder wall close to the knot of the ligature. The ends of the ligature were then tied to the probe which was withdrawn through the bladder and urethra so that the end of the ligature hung from the external urinary meatus. The opera-

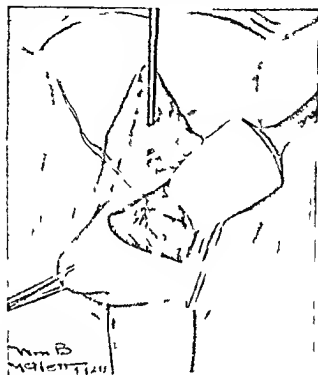


Fig. 242—A vaginal approach to the bladder. A probe is introduced through the urethra, pushed through the bladder wall close to the knot of the ligature. The ends of the ligature are then tied to the probe which is withdrawn through the bladder and urethra so that the end of the ligature hangs from the external urinary meatus.

tion was completed by the introduction of a small vaginal drape. I am sure that the tightly tied ligature would not pull through the lateral wall of the ureter into the bladder. This was not the case, and the ligature had not occurred by the time the probe was withdrawn. The probe was then pushed upon the end of the ligature, and a rubber band was tied around the end of the probe. A few days later the probe was withdrawn, and the ligature was found to be in place.

passed through the vagina the patient was relieved of the symptoms from the obstruction and later a cystoscopic examina-

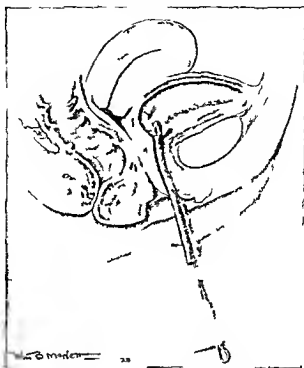


Fig 243—Vaginal cystostomy (lud d) T p d t th t
t g f n w p g b tw th t d bl dd t t f m mall
bb b d nad upo th d f th l g t Th l g t h w
th ead ed th gh m ll ft bb cath t t p t t the th T
p t l g th cath t e th r pl gg d th d d th gh
co t g t be t u l

tion showed that a large funnel shaped orifice had been formed from the bladder into the ureter

THE TOLERANCE OF THE KIDNEY OF TRAUMA AND INFECTION

WHAT fractional part of a single kidney is necessary to sustain life? How long may a patient live with purulent pyelitis and calculi? How often may and how frequently do stones again form after nephrolithotomy or pyelolithotomy? How may recurrent nephrolithiasis be prevented? What is the tolerance of the kidney to calculous disease and to repeated operative traumatism?

These questions often arise and are partially answered by the case of the patient herewith presented who has had eight operations upon the kidneys for the removal of stones or for relief from the complications resulting from calculi. Twenty six years have elapsed since the first operation and for twenty years the patient has lived with a single kidney and thus the seat of recurrent calculi. This residual kidney has now been opened for the extraction of stones four times and now were the patient not eighty five years of age we would consider a fifth nephrolithotomy for stones have again formed.

Recurrent Nephrolithiasis, Seven Nephrotomies or Nephrolithotomies and a Nephrectomy with Recovery —Mrs H D M age eighty five. Multipara of spare build, sallow complexion and with well marked arteriosclerosis forty seven years ago developed attacks of indigestion, violent headaches and severe backaches with marked dysuria and urinary tenesmus. In 1902 a plastic operation and ventral suspension were performed for proidentia. Six months later a sudden attack of calculous anuria developed with delirium and a temperature reaching 104° F. The anuria lasted twenty four hours and the fever and delirium persisting on the sixth day of the attack I opened both kidneys draining a large left hydronephrosis and removing a large coral calculus from the right kidney. At this time the patient has never had pain on the right side. One year later however pain developed upon the right side and the roent

genogram showed the presence of calculi in both kidneys. The abdominal walls were so thin that the stones in the shrunken left kidney could be palpated. I again simultaneously opened both kidneys removing four stones from one side and three from the other. The following year a small pyelonephrosis was

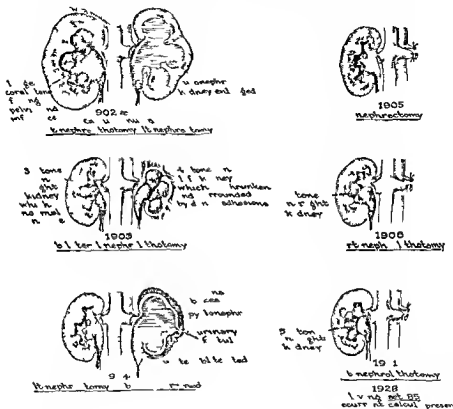


Fig 244—M t of 1 f cto d p t p e t d p e t P
t l h t r y o f g h t p t p o t h k d y f M H D M

found on the left side which was drained under local anesthesia. The left ureter was apparently obliterated and a troublesome urinary sinus persisted so that a few months later in January 1905 I removed the left kidney. A year after this renewed colic having occurred on the right side I opened the right kidney for the third time and removed five stones of moderate size

Fifteen years later under local anesthesia I again removed five stones from the right kidney. This patient therefore has had a total of eight operations upon her kidneys. The urine now has a specific gravity of 1006 to 1008. There is polyuria, phosphaturia, slight albuminuria and varying amounts of mucus. Stones have again been deposited since the last operation. The tolerance of the kidney of operative traumatism is also illustrated by another patient.

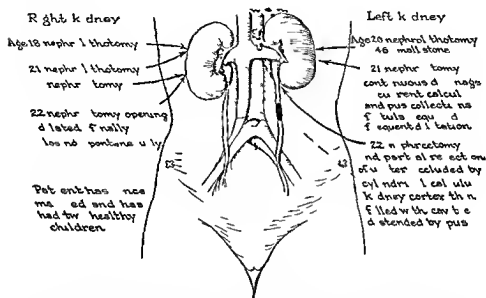


Fig. 245.—Maintenance of renal function despite chronic puulent infection and repeated operative traumatism. Pictorial history of six operations upon the kidney of Miss N. K.

Recurrent Nephrolithiasis Seven Operations upon the Kidneys Including Nephrectomy Recovery, Marriage and Pregnancies—Miss N. K. age twenty six poorly developed. At sixteen had influenza followed by vesical symptoms. When eighteen years old stones were removed from the right kidney. The wound healed in three weeks. A year later pain developed in the left side and at twenty from 4 to 6 small stones were removed from the left kidney. This was followed by the formation of a succession of small abscesses. Permanent tube drainage was instituted upon each side. About six months later the left

nephrostomy opening was enlarged under local anesthesia pus evacuated and calculi removed. I first saw the patient in October 1907. Catheters had then been continuously worn in both kidneys for eighteen months and had caused considerable trouble especially at times from the difficulty of reintroducing them. By the injection of colored fluids the left ureter was found to be obstructed. The roentgenogram showed the presence

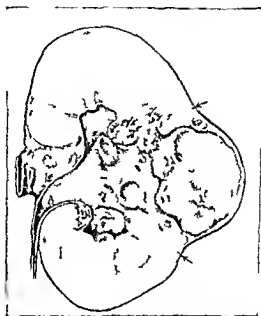


Fig. 246.—Calculation with distention of the left kidney
 showing the nature of the calculus and the position of the
 calculus.

of multiple stones in the region of the right kidney and none in the left. Quantities of fetid urine and pus could be expressed from about the left kidney. In November 1907 under spinal anesthesia I removed the left kidney and evacuated perinephritic abscesses. The cause of the recurrent calculi was found in a stone which completely blocked the upper end of the ureter. The kidney was almost entirely destroyed and contained many cavities filled with fetid pus and many embedded calculi. The

right nephrostomy opening was dilated and the patency of the right ureter established by the passage of ureteral catheters. A few weeks later it was necessary to re establish temporarily the drainage on the right side. Shortly after this all sinuses closed and a few months later when the patient presented herself she had gained 25 pounds in weight the urine was clear but the sediment showed a moderate number of leukocytes. This patient has since married and has been delivered of two healthy

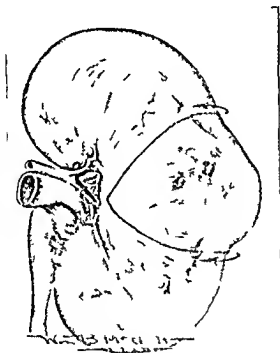


Fig. 247.—Incision for rectifying the equator of the kidney.

children despite the fact that her residual kidney had twice been incised for the removal of stones and was subjected for eighteen months to the constant irritation of a drain.

When stones are removed from the kidney every effort should be made to prevent their reformation. As a rule the stones should be removed by a pyelotomy rather than a nephrotomy. Three factors favor the reformation of calculi: (1) Blood clot remaining in the kidney upon which calcareous deposit may occur; (2) a dilated pelvis or calyces; and (3) failure to re-

move all particles of stone. There is of course much less hemorrhage into the kidney after pyelotomy than after nephrolithotomy. If the pelvis or calices are dilated an attempt should be made to overcome the pocket by plastic operation on the pelvis or plastic resection of the kidney. In 1911 I first did an equatorial resection of the kidney to obliterate an irregular cavity due to a large coral calculus. The poles of the kidney

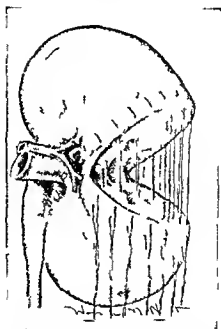


Fig. 48.—Resection of kidney with plastic mattress suture placed

were united by suture and the patient made a very satisfactory convalescence. In suturing the kidney vertical mattress-sutures should be used so placed as to produce the least possible obstruction of the renal tubules (Fig. 249).

The following two patients referred from the Surgical Dispensary of the Hospital present related but rather rare cutaneous or subcutaneous lumps easily mistaken for true tumors.

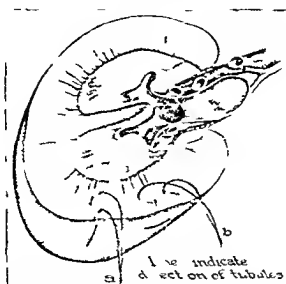


Fig 249—Preferred method of suturing the kidney. To prevent compression and obstruction of the renal tubules the mattress-sutures should be introduced as indicated at *a* rather than *b*.

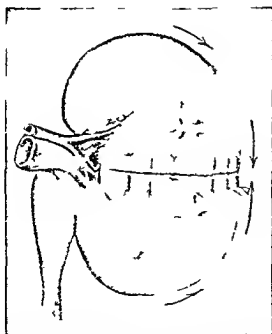


Fig 250—Suture of resected kidney completed. By eliminating the dilated pelvis and calyces retention of urine and the tendency to calcareous deposits largely overcome.

CUTANEOUS PHLEBOLITH

THIS patient a girl of twenty admitted for the removal of a mass in the skin on the lateral surface of the upper third of the left leg. This was first noticed about one year ago after a blow accidentally received in playing basketball. After the injury there was transient pain and tenderness and now there remains a painless hard lump the size of a shoe button. The mass is

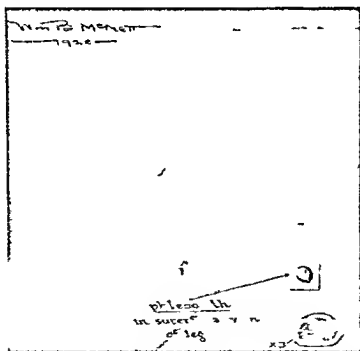


Fig 201—Cutaneous phlebolith on the lateral side of the upper third of the leg

stony hard is not tender the overlying skin is lightly reddened and thinner than the adjacent skin. The veins of the leg are not varicose nor is it evident that the mass is within a vein. Under local anesthesia with procaine-adrenalin the lump is readily excised and proves to be a small section of an obliterated cutaneous vein containing a stony and calcified phlebolith about 5 mm

in diameter. The surface is of a pale yellow color and is very smooth with the exception of two shallow grooves. Under the thin yellow stony cortex are the remains of a laminated thrombus infiltrated by lime salts. Phleboliths which constitute a common source of error in roentgenograms of the pelvis and abdomen are rather rare in the superficial veins although perhaps next to tophi are the most common source of a calcareous deposit in the skin.

BALL THROMBUS IN THE EXTERNAL FACIAL VEIN

THE next patient a man of about fifty five years has noticed a rounded mass in the left zygoma for seven months. Two years ago he had an amputation of the penis and scrotum for carcinoma and as would be expected is fearful of recurrence. There is no history of injury. The mass is spherical movable under the skin and is free from pain and tenderness. The skin shows

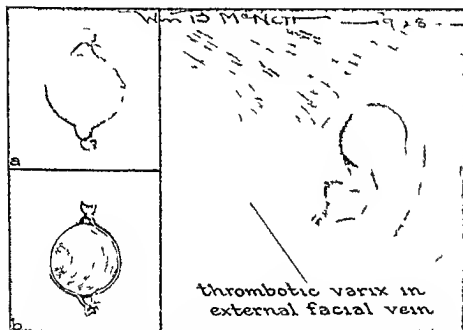


Fig. 252—Thrombotic varix in the external facial vein resembling a subcutaneous fibroma or fibrosarcoma

no discoloration or edema. The mass is higher and more globular than the common enlarged parotid lymph node. The outline is regular, the consistency firm, and the surface is not craggy as with a lymph node invaded by metastatic carcinoma. It has the consistence of a fibroma but is single and does not grow from the skin like a fibroneuroma nor has it the softness or the lobulated outline of a lipoma. Evidently it lies above and is

not attached to the parotid gland. Under local anesthesia the mass is easily enucleated and consists of a varix of the obliterated external facial vein containing a firm ball shaped thrombus of laminated clot. The small skin incision is accurately united by fine horsehair.

The 2 cases emphasize the fact that a thrombus may form a globular well circumscribed painless mass easily mistaken for an enlarged lymph node or tumor. The obliterated vein may not be evident without an incision through the skin.

BREAKING OF THE NEEDLE IN SPINAL PUNCTURE

THE following patient is referred from the Neurologic Service for the removal of a portion of a broken needle from the spine. In attempts at spinal puncture and spinal anesthesia the needle is not infrequently broken. A defect of the needle usually from internal rusting or the bending of the needle due to a sudden movement of the patient causes it to break. If from movement

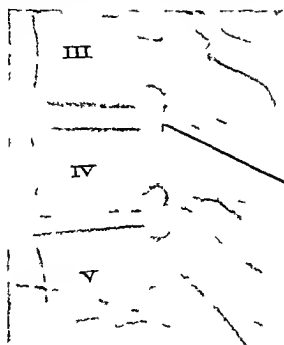


Fig. 253—Needle broken in spinal canal

of the patient the break usually occurs on the level of the laminae which coming together shear the needle in two. The accident has happened so frequently that brittle needle or those that may corrode should not be used for spinal puncture. Needles of nickeloid, iridium, platinum or of the more flexible rustless steel alloys should be used.

Miss Freda L. age eighteen developed violent choreiform movements in April 1921. The condition increased in severity and in June 1921 she entered a hospital where she was treated for over nine weeks with improvement. In January 1923 a relapse occurred with violent twitching and movements more marked than ever before for which she was therefore admitted to our Neurologic Service with a diagnosis of Huntington's chorea. It has been necessary to restrain the patient to prevent her falling from bed. One week ago the resident physician on the service attempted a spinal puncture. A 19 gauge needle was successfully introduced and as the spinal fluid was running from the needle the patient suddenly extended the body, the laminae coming together and shearing off the needle. A length of about 5 cm. remained in the patient's back. Since this time there has been no leakage of spinal fluid but the patient has complained of such pain in the back that morphin has been used. She does not know that a needle was broken in the back. The roentgenogram shows the outer end of the needle in the third lumbar interspace on a level with the laminae. It lies to the left of the midline and is directed upward and forward. If the third interspinous ligament is divided transversely with the knife blade so tilted as also to cut obliquely from above downward the scalpel should be arrested by contact with the needle. Under gas ether a 6 cm. vertical incision is made centering over the third lumbar interspace. On partially dividing the interspinous ligament a yellowish green discoloration of tissue is found which followed brings us to the broken needle. The needle is withdrawn and the wound carefully closed in layers.

Comment—The operation was followed by complaint of some lumbar pain, numbness and weakness in the extremities with a sensation of electric like shocks from the hips to the toes of both legs. The pains continued for six days after the operation since which time the patient has had a marked improvement in all symptoms.

The breaking of a spinal needle is not uncommon. In the twenty four years that we have used spinal anesthesia I have had one needle break beneath the skin and several needles break

through the part projecting from the skin. The needle broken under the skin was a very fine (24 gage) steel needle that I introduced in a child aged three years. The child suddenly straightened her back breaking needle. I then was immediately given the needle tract carefully followed by the trace of rust from the needle until the broken end was seen between the laminæ and removed. In a number of instances the broken part of the needle has been left in the spine without immediate symptoms. In one case reported from the German literature the patient suffered no ill effect although the portion of the needle had been in the spine for two years. One physician wrote me that he was threatened with suit after such an accident.

In any case the fragment should be promptly removed. A careful dissection is desirable with a field kept as dry and free from blood staining as possible. Fortunately the portion of needle is rarely as difficult to remove as a bit of needle from the hand or deep tissues of the arm.

SPINA BIFIDA

THIS plump attractive baby boy comes from central Pennsylvania for the correction of a large spina bifida. While the sac is large and apparently formidable we believe this to be one of atype in which the results from operation are especially good. The mass is very thin walled and translucent always an indication that the sac is lined by nerve roots with or without a part of the spinal cord. The low situation of the sac upon the sacrum is favorable as the nerve roots stretched and damaged by being spread out within the sac may be largely posterior sensory nerve roots and without important function. The anus is not flat and relaxed as it would be if paralyzed but is retracted contracted and puckered. In response to a pin prick the toes feet and legs are freely moved. The common and very distressing complication of paralysis of the sphincters and legs is therefore absent. The sac is completely covered by epithelium and has been since birth a most favorable condition. Over the most common form of spina bifida the myelocoele or meningo myelocoele there is a central red granular denuded area (*area medullo asculosa*) which is really the open and exposed spinal cord and central canal of the cord a condition favoring early infection meningitis or if the child lives for a sufficient length of time hydrocephalus. If such a denuded area is present paralysis of the sphincters and to some degree of the lower legs is inevitable.

For treatment and prognosis we should clearly differentiate four varieties of spina bifida.

1 Meningomyelocoele — Thin walled translucent sac with a central moist red granular area of exposed cord paralysis and loss of sphincter control invariable club foot and hydrocephalus common usually dorsolumbar. Mortality in the first twelve months without operation 98 per cent. Mortality after early operation 60 per cent. A percentage of these children have incomplete

paralysis and after operation learn to walk with or without artificial aid. The incontinence of urine and feces is persistent. *To give the infant the best hope of life an operation should be done before the exposed cord becomes infected or within twenty-four hours after birth.* The newborn baby stands this severe operation relatively well. I have had no death on the operating table with any form of spina bifida.

2 **Syringomyelocoele**—Second in order of frequency. Thin walled translucent sac lined by nerve filaments and possibly the cord but completely covered by epithelium. There is no denuded surface. Often sacral without involvement of the cord proper and with good sphincter control and little or no paralysis. Hydrocephalus is often absent. Mortality during the first ten months without operation 90 per cent from rupture of the sac or complications. Operative mortality about 10 per cent. *Operation should be done between the third and fourth months or immediately if the sac ruptures or starts to leak.* After operation for sacral syringomyelocoele the child often develops normally and remains free from secondary complications.

3 **Meningocoele**—Third in order of frequency. Thick walled sac covered by normal skin and not by a thin membrane. Translucent only when viewed with confined light. The nerve roots or cord do not enter the sac. Frequently sacral in position. Hydrocephalus is not common. Paralysis is absent. Unless severely traumatized does not endanger life. Mortality during the first year about that of a normal infant. Operative mortality 2 per cent. *Operation may be deferred until the child is three to six years old.*

4 **Spina Bifida Occulta**—No external sac but often a localized growth of long hair over the defect. Frequently associated with an extradural tumor. Often unrecognized until the symptoms from pressure or traction on the nerve roots appear between the ages of eight and eighteen. Operation usually may be safely delayed until the onset of symptoms. If a tumor is recognized it should be removed early.

Patient Robert W. age four months the first child of living healthy parent. A well nourished infant without deformity or

evident paralysis. The translucent sac 11 cm in diameter springs from the sacrum, shows fluctuation, pulsates and becomes tense when the infant cries.



Fig. 254—Type of large sacral syringomyelocele. Ectomy and plastic operation. Recovery with no apparent palsy.

Operation—To prevent loss of cerebrospinal fluid the infant is suspended head down by the groins from a tightly stretched

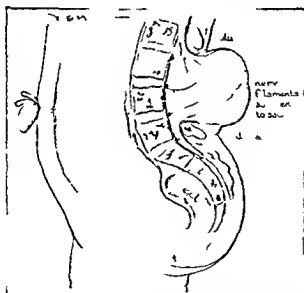


Fig. 255—Lumbar myelocele showing the relation of the nerve roots to the sac.

blanket. Under local anesthesia with procain the delicate covering of the sac is removed and the adherent nerve roots running in the lining of the sac freed. There is an oval opening into the

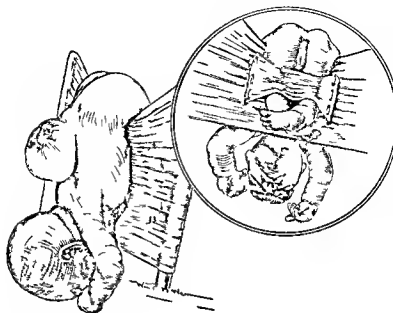


Fig 256—P t n d n o p t g f p b f d



Fig 257—Th sa f p b f d a p e d h w g t h t t h m t f t h r v
o o t t t h u f f t h s a

sacrum measuring 22 x 10 mm. Through the upper part of this opening the end of the spinal cord is seen between the fibers of the cauda is a central cyst measuring about 5 x 2 cm. This is partially resected and the nerve roots returned within the bony canal. The bony margins of the opening are too flat for a satisfactory osteoplastic closure. The pia and then the dura are loosened about the bony opening and closed. Two



Fig 258—The nerve roots have been returned to the bony canal the sac has been resected and the pia arachnoid sutured. The dura has been separated from the margins of the bony defect and is being sutured.

strips of muscle and aponeurosis left attached above and below are sutured to the midline and united over the bone defect. The external sac has been removed by a transverse skin incision the margins of which are united from above downward giving a transverse scar. Fine silkworm gut and horsehair are used. (The patient was discharged from the hospital six days after operation and has made an uneventful recovery.)

Comment—In the literature you will find the advice given

W WAYNE BABCOCK

to operate for spina bifida after the child is a year old. From an experience in operating upon about 80 of these infants I cannot too strongly emphasize the importance of operating upon an open spina bifida (meningocele) immediately after birth upon closed and thin walled sacs (syringomyelocele) by the third or fourth month while operation upon the thick walled sac (meningocele) may be delayed until the child is three years old or begins to endanger the sac by rough play.

PARALYSIS OF THE MUSCULOSPINAL NERVE FROM THE THERAPEUTIC INJECTION OF QUININ AND UREA HYDROCHLORID

F S age twenty two medical student In June 1927 during an attack of lobar pneumonia an intramuscular injection of 1 c c of 50 per cent solution of quinin and urea was given in the lateral part of the upper third of the right arm This was followed by loss of sensation on the dorsum of the hand and forearm and by wrist drop The paralysis involved



Fig 258a—Wrist drop from injection of quinin (Dr Scattergood)

the muscles supplied by the right musculospinal nerve below the level of the triceps Under treatment with baking massage and electricity there has been slight sensory but no motor return although deep pressure tingling (Tinel's sign) has extended to the forearm There is atrophy and wasting of the brachioradialis and the extensors of the hand and fingers with some edema and redness of the dorsum of the hand

Operation—December 27 1927 under local anesthesia The musculospinal nerve was exposed by a vertical 12 cm incision carried between the medial and lateral heads of the

triceps The sheath of the nerve was divided for a distance of 1 cm and the fibers separated and explored by hersage The nerve was fibrotic but without enlargement or neuroma About one third of the bundles of nerve fibers were yellowish and apparently degenerated for a distance of 4 cm Above and below this area the nerve trunk was apparantly normal The fibers of adjacent muscles were dry brittle avascular but not adherent The degenerated portions of muscles were excised the open nerve placed in a vascular bed against living muscle and the wound closed in layers without drainage

Comment —The destructive action of strong solutions of quinin and urea upon soft tissues is shown An aseptic necrosis is produced without the production of new blood vessels This persistent avascularity explains the absence of regenerative changes in the nerve Not only were the intrinsic blood vessels of the nerve obliterated but the vessels of the adjacent muscles were also destroyed Firm adhesions were not produced or new blood vessels or connective tissue formed The remarkable action of the quinin compound in causing necrosis without secondary vascularization or repair explains the persistence of the paralysis and the necessity of removing the necrotic tissue by operation and the placing of the damaged portion of the nerve in a vascular bed If evidence of regeneration does not follow the operation the damaged portion of the nerve should be freely excised and the ends united by fine silk sutures placed in the nerve sheath A gap of over 13 cm in the musculospinal nerve may be overcome by the slack obtained by flexing the forearm and adducting the arm

(Three months after the operation faint voluntary contractions were observed in the brachioradialis five months after the operation well marked voluntary contractions had returned to all of the paralyzed muscles)

CLINIC OF DR JOHN BERTON CARVETT

PHILADELPHIA GENERAL HOSPITAL

THE TREATMENT OF CHRONIC LEG ULCERS

PROPHYLACTIC treatment can prevent the great majority of chronic leg ulcers. Infection in the form of a spreading suppurative cellulitis is the usual cause for the original destruction of tissue leading to the formation of the chronic ulcer. The infecting germs gain entrance as a rule through a trifling abrasion or wound such as that produced by scratching with the finger nails. Prevention of scratching in individuals with eczematous or other forms of itching legs can be accomplished by voluntary restraint during the waking hours and by wearing pajamas or long legged bed stockings at night.

Even trifling wounds of the anterior or lateral aspects of the lower two thirds of the legs demand most scrupulous care otherwise disastrous infection is apt to occur because of the poor blood supply. When a patient telephones that he has received a minor skin wound I am content for him to carry on with home treatment provided the lesion is anywhere except in the dangerous leg area. If the wound be in the latter region I demand that the patient report at my office daily until it is completely and perfectly healed.

A beginning infection in a leg wound calls for immediate confinement to bed and early resort to incision at the onset of cellulitis. Extending or extensive suppurative cellulitis demands multiple parallel longitudinal incisions to provide free drainage of pus and prevent further extension of the infection. On no other part of the body surface does gangrenous sloughing of the skin result so frequently and widely from its blood supply being shut off by suppurative cellulitis. Any gangrenous skin area

should be excised immediately and by keeping just within the line of demarcation an anesthetic is not required

The custom is all too prevalent of relying upon nature for epithelization of large skin defects resulting from infection burns or other trauma. This practice is to be deplored in any region but particularly so in the legs. Ultimate results abundantly justify the general principle of employing grafts for any skin defect that is more than 2 or 3 inches across at its narrowest point. The time to do the grafting is at the earliest moment that a skin defect from any cause is free from dead tissue is reasonably free from infection and is covered by healthy granulations. These three requisites can be speeded up by a great variety of well known methods and I will not attempt to discuss my own preferences. Follow any bobby of preliminary treatment you like but do not fail to apply grafts as soon as conditions are favorable. Early grafting prevents the transition from an acute skin defect to a chronic ulcer.

The two processes of epithelization and formation of granulations progress simultaneously in every non malignant raw surface of the skin or mucous membrane. Epithelization is always a beneficent process which should be protected and encouraged. The formation of granulation tissue at first is helpful in forming a vascular bed favorable to the multiplication extension and growth of epithelial cells. With delay in epithelization due to large size of area infection or any other cause the granulations proceed to form fibrous tissue. The contraction of the newly formed fibrous tissue compresses the smaller blood vessels and thereby diminishes a blood supply which in the leg was originally deficient. Diminished blood supply retards or stops epithelization. There is thus established the vicious circle of delayed epithelization increased scar tissue and diminished vascularity. The pernicious activity of the granulations in forming fibrous tissue ceases except in certain cases of keloid as soon as they become covered by epithelial cells. The choking off of the blood supply as well as contracture deformities incident to delayed healing of large raw surfaces can be prevented or minimized by early resort to skin

grafting. Other factors being equal the longer the delay in epithelization the greater will be the formation of fibrous tissue.

In granulating areas of a year or longer duration the fibrous tissue commonly attains a thickness of $\frac{1}{2}$ inch or much more and prevents further epithelization. The fibrosis and lack of healing in old ulcers resemble the conditions found in ray burns. Because excision of scar tissue followed by skin grafting promoted such prompt healing in obstinate ray ulcers I began several



Fig. 259—Burn of leg and foot twelve years before admission. Three years ago little toe amputated for contractures and grafts from toe implanted over unhealed fibrosed ulcer. Recurrence of ulcers four months ago.

years ago to employ the same procedure in the treatment of indolent fibrotic leg ulcers and have obtained similarly good results. In the majority of ulcers which do not exceed a few months in duration grafting without excision of fibrous tissue will bring about permanent healing.

I have never grafted skin on an ulcer of long standing with thick fibrous base but I have seen many cases in which it has been done. Grafts placed over a thick base often do well under the favorable conditions existing in a hospital but they com-

monly break down with recurrence of the ulcer when the leg is subjected to the vicissitudes of the normal activities of life (Fig. 259). Skin grafting under these conditions is similar to the attempt of trying to create a lawn by placing sod over a layer of clay. The sod apparently does well at first but it dies when subjected to drought, hot weather and foot traffic. To preserve the sod it is needful to substitute a good subsoil for



Fig. 260—Same case. Fig. 259 fifteen days after completion of fibrous tissue skin grafting.

the clay. In chronic ulcers it is necessary to substitute a thin layer of well vascularized granulations for the comparatively bloodless thick layer of fibrous tissue (Fig. 260).

The extent and thickness of fibrous tissue can be determined by the resistance encountered on careful palpation of the open ulcer and adjacent tissues. Palpation of the similar area in the opposite leg for comparison is helpful. A soft pliable yielding ulcer base indicates comparative freedom from fibrosis and

grafting may be done without preliminary excision of fibrous tissue. The fibrous tissue layer in long standing ulcers as a rule is more and at times much more than $\frac{1}{2}$ inch in thickness and seriously interferes with the blood supply to the overlying granulations. The firmer more rigid and more unyielding the ulcer base the greater is the fibrosis and therefore the greater the need for its excision before grafts are applied. The thick fibrous tissue layer needing excision commonly extends to a



Fig 261 —Indolent chronic ulcer

greater or lesser distance beyond the margins of the present ulcer (Compare Fig 259 with Fig 260)

Before excising the fibrous tissue the operative field if necessary should be freed from scabs, crusts and gross infection by a few days of preliminary treatment. The operation should be planned to excise the entire area of thick fibrous tissue down to the deep fascia. This area will include all of the present granulating surface as well as more or less of the previously granulating surface which is at present covered by epithelium.

(Compare Fig 261 with Fig 267) The overlying skin should be removed with the fibrous tissue. Removal of fibrous tissue by undermining results in sloughing of the overlying skin with great delay in healing. The extent of the excision can be determined approximately by palpation before operation but more certainly by inspection of the thickness of the fibrous layer during operation. Excision should extend peripherally to include all fibrous tissue that is more than $\frac{1}{2}$ inch in thickness. Failure to observe this rule perpetuates the poor vascularization (1)

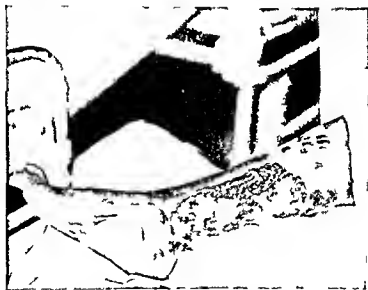


Fig 267—Same case Fig 261 After removal of fibrous tissue

of wound edge which is slow to heal and (2) of surrounding area in which existing skin is prone to break down under slight provocation. The usual tendency is to remove too small an area at operation. The fibrous tissue is intimately attached to the deep fascia and it is impossible to find a line of cleavage between them. The fibrous layer has to be shaved off from the fascia. Care should be exercised to remove all the fibrous tissue and not buttonhole the fascia. After the primary *en masse* removal there often remain one or more small areas of incompletely

removed fibrous tissue which need excision. Failure to excise them retards or prevents healthy granulations growing over them. If a buttonhole is made in the deep fascia the granulations at that point must come from the underlying muscles which by their constant movement interfere with growth of granulations with consequent delay in healing.



Fig. 263 —Chronic leg ulcer

Excision of the fibrous tissue is attended by very little hemorrhage except possibly at the periphery of the wound where some larger veins may require ligation. The blood supply to the deep fascia is never very good but it is adequate to develop healthy granulations competent for the permanent nutrition of grafted skin.

In from ten to thirty days the denuded area becomes cov

the patient relieving him of all possible foci of infection and when his condition will warrant operative delay giving him fluids and glucose. If jaundiced fresh serum (Moynihan) or calcium (5 c.c. of a 10 per cent solution) should be given intravenously daily for three days. Transfusion is sometimes indicated.

The use of novocain anesthesia and splanchnic (anterior or posterior) and regional block of the abdominal wall does much to help the patients (*vide infra*). In fact it permits surgery upon acute cases who are too ill from their disease or from a decompensated heart to allow the use of a general anesthetic. This is especially true in the aged. In our hands it has been used of necessity in such cases as an empyema of the gall bladder in a patient with a fibrillating heart again in cases suffering with acute bronchitis and an empyema of the gall bladder. Both cases made a good recovery.

The operations that may be performed for cholelithiasis limited to the gall bladder are cholecystotomy, cholecystotomy (with drainage) and cholecystectomy.

The following cases will illustrate the indications for the various operations and the technic of the operations performed.

Case I—D. H., a housewife thirty six years of age.

History—One year before admission the patient had an attack of upper right quadrant pain associated with vomiting which lasted about five days. Since that time she was well until two weeks before admission when she had a return of her acute pain. It was knife like and radiated to the back and right scapula. The acute pain was intermittent but there was a continuous dull aching always present in the region of the right hypochondrium. Shortly after the pain began she became nauseated and vomited at intervals small amounts of bitter greenish material. During the week before admission she had eaten very little. The patient does not remember ever having been jaundiced. Her urine was never dark and her stool have been of normal color.

Past Medical History—Typhoid fever at thirteen years and

other diseases of childhood Several pelvic operations Eleven pregnancies

Physical Examination—Temperature 98.3 F pulse 92 respiration 20 blood pressure 108/70 Patient is a thin adult female not in evident pain no jaundice Examination shows no significant abnormalities except in those of the abdomen The abdominal wall is scaphoid and relaxed and there is tenderness over the gall bladder There is no rigidity and no masses are palpable Normal peristaltic sounds are heard Red blood cells 3 500 000 white blood cells 7 000 hemoglobin 80 per



Fig. 268.—Line of transverse incision showing relation to abdominal muscles and gall bladder

cent Urine contains no bile pigments x Ray of gastrointestinal tract negative A diagnosis of chronic gall bladder disease was made

Operation—Posterior splanchnic and anterior abdominal block anesthesia A transverse incision is made about three fingerbreadths above the umbilicus (Fig. 268) Bleeding points in the subcutaneous tissue were caught and the wound covers applied The oblique muscles are split transversely and the peritoneum opened enough to admit the operator's right index finger (Figs. 269-270) The gall bladder is found to contain a stone Guided

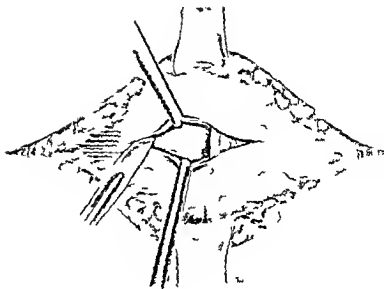


Fig 269—Specified edge showing although block
t edge of tu

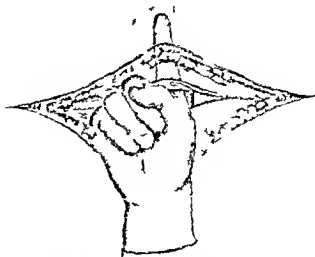


Fig 270—Penton m or d h w g palp (fig 1) bl dd bef

by the left index finger inserted into the wound local anesthesia is introduced through the muscles to bleb the peritoneum for a distance of about 4 cm from the incision in all directions. The finger in the abdomen guards the needle from entering any of the abdominal viscera and by feeling the peritoneum swell up under the finger the operator is able to tell that his injection is reaching the intended location (Fig 271). With the left index finger still in the abdomen palm up a double row of double No. 1 iodine catgut sutures are inserted with a curved Mayo needle across the rectus muscle. These stitches are placed so as to include the full thickness of the muscle and its anterior and

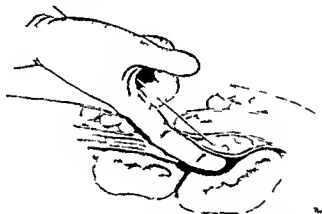


Fig 271 —Anesthesia of subperitoneal tissues showing finger in abdomen guarding injection

posterior sheaths. The finger in the abdomen guides the needle and protects the abdominal viscera. As each suture is tied a hemostat is placed on the free end and the needle end cut close to the knot. The two rows usually require three or four sutures and a space of about 1 inch is allowed between the rows. The original incision is then enlarged by stretching transversely the original opening and with two fingers in the abdomen the rectus is cut across transversely between the two rows of sutures previously inserted (Fig 272). If the sutures have been properly placed no bleeding from the muscles should occur. Occasionally however a small vessel lying upon the posterior rectus sheath must be caught and tied. This incision has been used by the pro-

fession for some years and has proved at least in our hands very satisfactory. Its chief advantages are the exposure it gives of the gall bladder, ducts, stomach and appendix and also the ease with which it is closed. If drainage is necessary it can frequently be brought out through a stab wound above. Its disadvantage is the hernia that may result if the wound is drained at the rectus edge. In many cases the paramedian incision is employed, the entire right rectus muscle being retracted outward (Fig. 278-279).

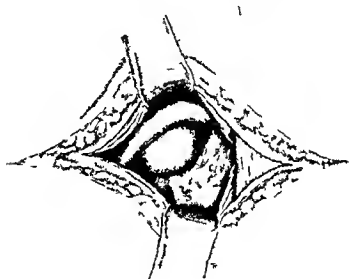


Fig. 272.—Enlarged gall bladder by splitting the gall bladder and exposing the gall bladder.

Drainage when employed is brought out through a puncture wound through the outer edge of the same muscle.

The gall bladder may now be visualized by inserting one small sponge against the round ligament, a large sponge downward to retract the duodenum, and a small tape to the right of the gall bladder under the liver. The abdominal cavity is now completely walled off from the field of operation. The gall bladder is of apparently normal color and consistency but contains one large stone which is impacted somewhat in the intumescence.

dibulum No stones are palpable in the cystic or common ducts The common duct is not dilated The gall bladder is now

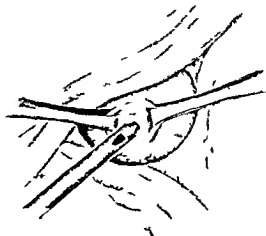


Fig 213—Aspiration of gall bladder (first step) Field wall d off w th gauze grasped with two Allis forceps and the pointed aspirator inserted (Fig 27c) The contents of the gall bladder having been evacu

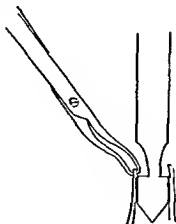


Fig 214—Aspiration of gall bladder (second step) Grasping the full thickness of gall bladder wall by inserting one blade of an Allis forcep into fenestra of aspirator

ated the aspirator is withdrawn until the fenestra appear Two small Allis forceps one on each side are inserted through the fenestra and closed so as to catch the entire thickness of the vesicle

wall (Fig 274) The opening in the gall bladder is now enlarged and the stone removed with stone forceps. It is rounded non facettted and translucent. The cholecystoscope is then inserted. No further stones are visible and bile is seen to emerge from the entrance of the cystic duct. The mucosa appears normal. Extreme care must be used throughout the intracystic manipulations not to injure the mucosa thereby causing hemorrhage. As the scope is withdrawn slowly the suction drains the bladder dry. During this entire procedure not a drop of bile was spilled into the abdominal cavity. The gall bladder opening is closed with a purse string of No. 00 chromic catgut in a small curved Ferguson needle and oversewed with several stitches of the same material. The wound is closed without drainage. The peritoneum is closed in the usual way with No. 1 chromic catgut and the anterior sheath and oblique muscle are sutured with a running suture of the same material. The sutures in the rectus are reinforced by tying the long ends of the rectus stitches across the line of incision. The skin is closed without drainage with Michel clips.

Discussion of Case—This patient does not represent the so called typical case of gall bladder disease in that she is a thin woman and not yet over forty. However we see many cases like this one who exhibit the typical symptoms of gall bladder disease—pain radiating to the back and right scapula, vomiting and tenderness over the gall bladder—which do not conform to the accepted type case. The etiologic factors in this patient appear fairly clear. Typhoid fever at the age of thirteen may possibly have left a bacterial nidus for stone formation. However the normal appearance of the gall bladder at operation makes it seem doubtful that she could have harbored an infection for some twenty three years without some evident pathologic change. The more likely cause of her single stone was one or more of her eleven pregnancies. The change of cholesterol metabolism associated with child birth is recognized as one of the chief etiologic factors in the formation of gall stones in women. Factors that lead us to believe that infection is secondary in gall stone formation are: gall stones are com-

monest in fat people hypercholesterolemia in 15 per cent of gall stone cases the earlier the diagnosis the less the evidence of infection in early life biliary (stone) colic is not preceded by a demonstrable cholecystitis bile is often sterile even with calculi the organism found in the gall bladder wall in acute obstructive cases is not found in the calculi or in the bile as a rule

The pain in this patient as in most of these cases is due to impaction of the stone so as to block the cystic duct at its entrance into the gall bladder The operation to be performed on the patients cannot well be determined before the organs are exposed and examined And since the various operations demand different amounts of exposure it is well to make a superficial examination with the finger as soon as the peritoneum is opened The surgeon is thereby able to get an idea of the lay of the land whether or not stones are present whether many adhesions are present whether the gall bladder is tense and edematous or soft and compressible in other words he is able to plan more intelligently the remainder of his incision Having completed the incision and the gall bladder being exposed the question arises as to the proper operative procedure to be undertaken in the case The answer to this question must be based on several factors

1 The appearance of the gall bladder This gall bladder is of the normal cerulean blue color translucent and not indurated There is no lymphadenitis or adhesions

2 The examination of the common duct The common duct in this case is of the normal goose quill size with none of the compensatory dilatation which we expect to find in those cases in which the gall bladder is no longer a functioning organ

3 The number and conformation of the stones The single stone found in this case was rounded with no suggestion of faceting and composed almost entirely of crystalline cholesterol

These answers in this case demand a cholecystotomy

It has been noted not infrequently that following cholecystectomy there is a feeling of slight nausea and distention in the epigastrium especially after taking fatty or fried foods This complaint is most frequent in younger persons whose gall

bladders have been removed because of the presence of stones but in whom the gall bladder is still functioning. In terms of pathologic physiology it means that the duodenum with its enzymes cannot readily take care of the fat in the meal aided only by the small amount of bile given to it from the common and hepatic ducts. A pylorospasm occurs giving the patient a feeling of nausea and distention of the upper abdomen. These patients if intelligent learn to avoid fatty foods for a time. The dilatation of the common duct so frequently seen at operation in cases of completely functionless gall bladders occurs also after functioning gall bladders have been removed. This dilatation in a measure takes over the function of the gall bladder so that the ability to eat fatty foods without indigestion is to a large degree regained. The removal of a functioning organ is to be avoided if relief can be obtained by other measures. The type of patient who presents this problem is usually in early adult life, often not fat, whose chief complaint is gall stone colic. At operation the gall bladder appears of normal color and thickness, its contents are a few small soft stones. These cases are usually classed as chronic gall bladder disease and a cholecystectomy performed. We believe that conservative surgery in these patients more nearly approximates the normal and that a cholecystotomy or cholecystostomy with removal of stones should be the operation of choice. The cause of the symptoms has been removed and the gall bladder returned to normal function.

Postoperative Notes—The postoperative convalescence of this patient was satisfactory. She was discharged twenty days after her operation. A cholecystogram made six months after operation shows a gall bladder of apparently normal function as evidenced by its ability to concentrate and empty.

This operation is one which should be done only in selected cases. The indications in general are a young patient, the normal appearing gall bladder with a single stone and no dilatation of the common duct. It is seldom indicated and employed by few surgeons. One patient operated on by the senior writer has passed twelve years since operation free from symptoms.

Two other cases have gone without symptoms—one for two years and one for eight months

It not infrequently happens that at operation for another lesion a gall stone will be found in the general abdominal examination. Such patients usually have had no symptoms referable to the gall bladder and if the stone be single or if there be two stones a cholecystotomy is the operation of choice especially if the main operative procedure has been extensive. A brief report of a recent case may illustrate our point. A working man sixty four years old came under our care four hours after the perforation of a duodenal ulcer. After oversewing the perforation two marble sized stones were palpated in the gall bladder. A cholecystotomy was performed. The patient's recovery was without incident.

Case II—Mrs. A. G. age sixty nine. This patient had been troubled with upper abdominal discomfort for two years but she had had no acute pain until a week before admission when she developed a knife like pain radiating to her back accompanied by nausea and vomiting. Since the attack began there has been an elevation of temperature and pulse rate. The pain gradually became less severe but a dull ache remained in the upper abdomen and the vomiting continued although this symptom was less marked than at first.

Physical Examination—Blood pressure 130/82 temperature 99.3 F pulse 86 respiration 28. Patient is an infirm old lady appearing older and weaker than her sixty nine years. She has a marked tremor of her hands and perhaps a slight icteric tint of the skin and sclera. The chest is broad respirations shallow and there are numerous coarse rales at both bases especially marked on the right side. The abdomen is obese there is marked tenderness and rigidity in the upper right quadrant no masses are palpable. The examination showed no other significant findings. White blood cells 10,500 hemoglobin 75 per cent.

Operation—Under local anesthesia (novocain $\frac{1}{2}$ per cent) block of anterior abdominal wall. A transverse incision was

made three fingerbreadths above the umbilicus. After separation of the adipose tissue a small incision was made transversely at the outer edge of the rectus and the muscles retracted up and down so as to expose the peritoneum. Making a small opening

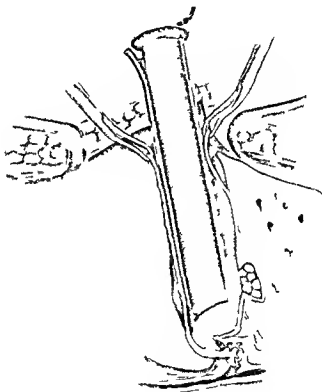


Fig. 275 — After the incision is made, the rectus abdominis muscle is retracted, and the peritoneum is exposed. The gall bladder is palpated in the abdominal cavity. The novocain infiltration of the preperitoneal tissues is then completed, and with the retractor inserted into the peritoneal opening.

in the peritoneum the finger was inserted into the abdomen a large mass was palpated in the gall bladder area gall bladder and adherent omentum presenting at the abdominal opening. The novocain infiltration of the preperitoneal tissues was then completed and with retractor inserted into the peritoneal open

ing the wound was enlarged by traction splitting the oblique and transversalis muscles (see Fig 272). The rectus muscle is not divided but rather retracted toward the midline. A very tense gall bladder presented into the wound surrounded by adherent edematous omentum. By gentle dissection with the finger the omentum was separated from the gall bladder and the field walled off by narrow tapes of gauze. As this dissection progressed pus appeared far down on the external surface of the gall bladder at a point where the omentum had walled off a gangrenous perforated area in the gall bladder wall. The blunt pointed aspirator was inserted through this opening and the pus evacuated rapidly. The gall bladder was then opened between two Allis forceps



Fig 276—Detail of view seen through cholecystoscope showing entrance of cystic duct into gall bladder. Black bubbles of bile coming from this orifice indicate a patent duct.

and two large stones about 1.5 cm in diameter were removed. The cholecystoscope was inserted showing no further stones and what was very encouraging to the surgeon bile appearing from the cystic duct (Figs 275-276). The mucosa looked fairly good except for the gangrenous spot through which the pus had escaped. A fenestrated tube was inserted into the gall bladder and the wall of the structure drawn tight around the tube by a purse string suture of double No. 1 iodine gut (Fig 277). On account of the marked edema no effort was made to invert the mucosa about the tube. The tube was secured by ligating it to the gall bladder with the free ends of the purse string suture. Four cigarette drains were inserted walling off the gall bladder from the rest of the abdomen. The wound was

closed about the tubes but the skin and subcutaneous fatty tissues were allowed to remain without suture

Discussion—This case represents a case of long standing cholelithiasis in which very few symptoms appeared until an acute infection occurred. Her two years of discomfort in the

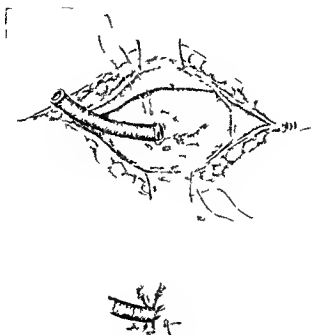


Fig 277—M th d t t g t be g ll bl dde h l y t t my
P t g f d bl N 00 h m g t S t th ght b d l p f
g ll bl dd pe g A t be p d d w d p t g t ght d
t g th gall bl dd

upper abdomen are probably accounted for by the chronic inflammation of the gall bladder but the acute symptoms only occurred when the stones became impacted with the resultant gangrene of the gall bladder wall. As soon as the palpating finger discovered the edematous mass the indications for a cholecystostomy were clear and since the gall bladder presented

at the abdominal incision no enlargement of the incision was necessary. The indications demanding a cholecystostomy in this patient were

1 The age and condition of the patient. This patient was sixty nine years old weakened by seven days of acute illness. Her lungs showed some evidence of a beginning hypostatic congestion and a blood vascular system none too strong.

2 The disease of the gall bladder. The gall bladder was surrounded by edematous omentum the wall was thickened and it contained frank pus.

Any attempt to remove the gall bladder would have been foolhardy. Because of the edema of the structures the cystic duct and artery could hardly have been identified without considerable trauma and the removal of the organ would open up avenues of infection which would probably lead to a local or even generalized peritonitis. A cholecystostomy gives relief of the acute condition and the least that can be done which will relieve the immediate emergency is the operation which is indicated in such a case.

Postoperative Course—The patient did well after operation. For about six days bile drainage was small in amount 2 to 3 ounces daily but as the edema about the cystic duct disappeared and the inflammatory process subsided drainage increased daily as usually occurs in these cases. If no bile appears at any stage blockage of the cystic duct is the cause. These cases will heal up a bydrops or empyema will occur and later the wound will break down and the gall bladder will evacuate its contents of pus or mucopus. Should bile appear at any time of rupture a stone will probably float out also. All the drainage and the tube in the gall bladder were removed by the tenth day and the bile drainage which was then very conspicuous was absorbed by cotton pads changed at frequent intervals. The bile drainage is most copious at night. This can be greatly reduced by giving a midnight light lunch. The wound closed gradually and on the tenth postoperative day the patient was allowed out of bed in a wheel chair. She was discharged on the twentieth day to be dressed by her family physician.

Drainage of the gall bladder should be employed 1 In severe acute cases where there is a ruptured gall bladder with walled off pericystic abscess where the induration and edema render it impossible to get exposure of the ducts either because of friability or hemorrhage It is in these cases that common and hepatic duct injury occur because of lack of visibility These cases also occasionally bleed postoperatively due to the fact that the cystic artery is ligated in an edematous mass which shrinking under the ligature pressure results in loosening and reactionary or secondary hemorrhage

2 In very ill patients poor risks either from their biliary disease or from renal vascular or cardiac pathology Extreme age and its debility is also a factor here

3 Cases with jaundice and its associated pathology

4 The physically difficult case In this group due consideration must be given to those factors that render the mere mechanics of the operation difficult If the patient is extremely obese takes the anesthetic poorly resulting in inadequate exposure the surgeon is inexperienced the assistance is poor the light not what it should be judgment must be used with a leaning toward a cholecystostomy for it must be remembered that our first consideration is to save life and the second is to reduce morbidity In the last analysis a drainage when properly done and the bladder cleared of stones as shown by the scope will result in more than 60 per cent of the patients needing no further surgery

The use of the scope we know has reduced the incidence of overlooked calculi 15 per cent This means that after the finger and scope have found the gall bladder supposedly full of calculi the scope has found stone in 15 of 100 cases The figure may be and probably is high made so by the fact that less digital and instrument exploration is being done as a result of more frequent and early use of the scope In one case the scope disclosed 21 stone nested in a pocket in the liver between it and the hepatic surface of the gall bladder They were impacted with a smooth fitted surface presenting flush with the bladder wall When the moenic was broken by an instrument

the calculi tumbled into the gall bladder lumen. It seems scarcely conceivable that these could be overlooked but such would have been the case without the use of the scope (see Fig. 275).

Case III—Mrs. S. G., a housewife, age forty-two years, had been troubled with indigestion for some years associated with some slight upper right quadrant pain. She never had an acute attack of pain necessitating a hypodermic. At times she has had attacks of diarrhea alternating with constipation. Her stools have always been of normal color and she never noticed



Fig. 278—Line of paramedian incision sometimes employed for cholecystectomy.

any yellowness of her skin or sclera. The patient on examination shows no abnormalities except for a slight tenderness over the gall bladder. Temperature, pulse and respiration normal as was also the blood picture. Cholecystogram showed gall bladder in normal position containing many stones (Figs. 278, 279).

Operation—Posterior splanchnic and anterior abdominal wall block anesthesia. The technic for the incision is the same as that described for cholecystotomy. When the gall bladder was exposed it was found thickened with adhesions to the duodenum and full of small faceted stones. Palpation of the common duct revealed no stones in that area and slight dilatation of the duct.

A cholecystectomy was therefore decided upon. A Kelly hemostat was placed on the fundus and by gentle traction with each inspiration the liver and gall bladder were brought into the wound. After cutting the duodenal adhesions a second Kelly hemostat was placed on the infundibulum and held on tension by the left

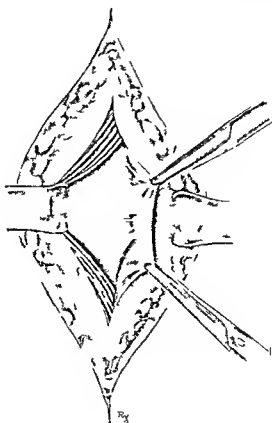


Fig. 19—P. m. d. I. th. h. t. t. h. th.
M. d. a. l. p. p. l. d. t. t. b. h. m. t. a. t. t. t. t. d. t. w. d.

hand making the cystic duct apparent. Bluntly dissecting the peritoneum with a curved hemostat the cystic duct and artery are isolated and two ligatures of No. 1 chromic catgut drawn around them (Fig. 280). Before tying the ligatures a careful relocation of the structures is made, relaxing the tension on the gall

bladder and making sure as to the position of the common and hepatic ducts. The fact that the cystic duct is usually small and free from blood vessels helps differentiate it from the larger common duct which is usually crossed by several small veins. The first ligature is then tied close to ($\frac{1}{8}$ inch from) the common duct and the second about $\frac{1}{8}$ inch from it toward the gall bladder. The first ligature is now cut leaving the second as a tractor

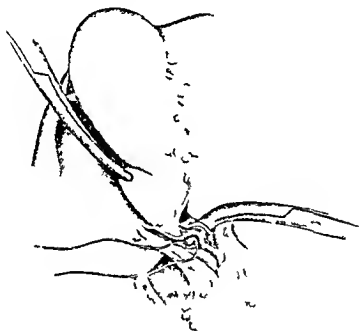


Fig 280—Cholecystectomy. Peritoneum reflected to expose cystic duct and artery. Kelly hemostat used to put duct on a stretch. Ligature being drawn around both duct and artery.

until the cystic duct is severed. A Shallcross clamp is now inserted so that the posterior blade emerges through the opening made behind the cystic duct. The duct is now cut close to the clamp and by turning the clamp the area is exposed for inspection for bleeding. By gentle blunt and scissor dissection the peritoneal reflections are turned back from the gall bladder so that the bed of the cystic duct is visualized. A suture of

No. 00 chromic catgut on a curved intestinal needle was placed and tied so as to unite these peritoneal layers. The suture is allowed to remain uncut to be used as a running suture to close the gall bladder bed. Now using blunt and scissor dissection as

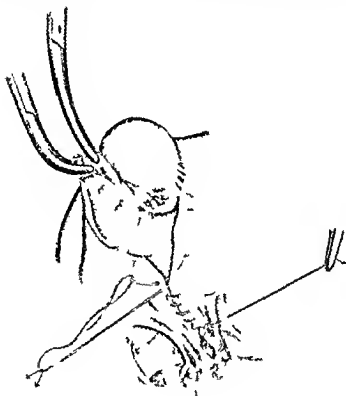


Fig. 281—Chl. t. t. my. Cyt. d. t. d. t. y. l. gat. d. d. bly.
F. t. l. g. t. t. d. l. d. t. t. G. l. bl. dd. fl. t. d.
upw. d. ut. f. t. be. l. p. t. l. fl. t. l. ft. l. g. d. d. b. g.
ut. f. \ 00 h. m. t. gut.

before the gall bladder is turned upward out of its bed the running suture following closely uniting the peritoneal reflections which have been left as long as possible so as to completely cover the gall bladder bed without tension (Fig. 281). The final attachment of gall bladder to the lower border of the liver is left as a

tractor for a time until completion of the running suture which is tied around this pedicle. Still using the gall bladder as a tractor a final examination of the operative region is made and the second cystic duct ligature cut. There being no bleeding the gall bladder is cut from its remaining attachment and removed. The appendix is now brought into the wound and removed without additional anesthesia. Closure without drainage is made in the manner described for cholecystotomy.

Postoperative Notes—The patient's convalescence was satisfactory. She was discharged on the sixteenth postoperative day. She has had no symptoms since operation.

Discussion—This patient represents the ideal case for cholecystectomy. A patient not extremely obese with a history of indigestion over a period of years, her gall bladder very thick and showing adhesions had evidently been the seat of an inflammatory process of long standing and in addition being full of stones was no longer an organ of much function. The beginning dilatation of the common duct showed that that structure was at least beginning to compensate for this loss. The technic for the removal of the gall bladder as described recommends itself because by this method all the operative procedures are completed as the operation progresses. Many cases may be closed without drainage. Closure without drainage is fraught with danger in a certain small percentage of cases either from hemorrhage slipping of the cystic duct ligature (in acute cases with induration) or the division of unrecognized accessory bile ducts which leak bile after closure. Such accessory ducts are reported by Mr. E. R. Flint to occur in about 15 per cent of postmortem examinations. When there is a slight ooze it is frequently controlled by suturing a small piece of muscle over the area. If after a sufficient trial the wound is not dry a rubber covered gauze drain is inserted into the gall bladder fossa. Our experience shows that cases of cholecystectomy with drainage stay in the hospital about ten days longer than those with out drainage.

Cholecystectomy is in a word indicated in all cases of injury of the gall bladder for cholecystostomy of subacute and chronic

cholecystitis cystic duct blockage stone or stricture fistula gangrene acute destructive cholecystitis when the disease is limited to the gall bladder the ducts being exposable and in carcinoma of the gall bladder. In other words incline to remove the gall bladder whenever possible with relative safety to your patient. This means other things being equal cholecystectomy should be done because the morbidity is less giving from 80 to 90 per cent cures. When contraindications are regarded the mortality from cholecystectomy is lower than that of cholecystostomy because the bad cases fall naturally into the latter group. The above is true in experienced hands only. In the hands of the casual operator cholecystectomy will give a higher mortality because of the added dangers of hemorrhage and common or hepatic duct injury.

Case IV—W. F. a business man of seventy one years has had epigastric discomfort for several years. Two months before admission while in the South he had a severe attack of chills and fever and upper abdominal pain which was mistaken for malaria. He recovered sufficiently to return to his occupation but noticed pain of a mild nature in the upper right quadrant accompanied by a feeling of distention. Two days before admission the patient experienced severe chills followed by fever pain and jaundice. His stools on the morning of admission were putty colored and his urine dark.

Physical Examination—Blood pressure 115/84 temperature 99° F pulse 16 respiration 26. The patient is a well preserved moderately obese man of seventy one not in pain but showing a distinct jaundice. There is a slight muscle spasm in the right upper quadrant with tenderness on deep palpation over the gall bladder area. The liver edge is palpable 1 inch below the costal margin. The remainder of the examination was negative. White blood cells 14,000 van den Bergh direct delayed indirect $\frac{1}{2}$ units.

Operation—Posterior splanchnic and anterior abdominal wall block anesthesia. The abdomen was opened through a transverse incision which was later extended vertically upward through

the right rectus muscle. With gauze pads placed to the left to hold back the round ligament and others below to displace the intestines a fan shaped field was exposed showing a markedly dilated common duct and a pale thick gall bladder. The operator now changes to the patient's left side and using his left hand inserts his fingers through the foramen of Winslow and his thumb retracting the duodenum he gains complete control of the anatomic difficulties and is able to palpate several stones in the common duct some of them behind the duodenum. The head of the pancreas can also be easily palpated. After identifying the common duct by aspirating bile from it with a small gauze needle and glass syringe two tension sutures of No. 00 chromic gut were placed in the duct and an opening made between them. Light colored bile escaped which was immediately aspirated by the small tipped aspirator. A small piece of gauze packing was then inserted into the duct toward the liver and by pressure with the fingers of the left hand the stones were made to emerge at the opening in the duct. The insertion of the packing has two purposes one to prevent any stone being expressed from below slipping past the opening into the duct above and the other is that frequently sand will be removed from the duct by adhering to the gauze mesh. When no further stones could be palpated behind the duodenum a small woven catheter was inserted down the duct and its tip could be palpated in the duodenum being thus assured that no further obstruction was present. Attention was now turned to the gall bladder. It was found full of faceted stones below the fundus was a marked and impassable constriction which made it evident that the organ could not be saved. A cholecystectomy was performed as described in Case III. The operation was completed by the insertion of a T tube into the common duct and the duct sutured about it using interrupted sutures of No. 00 chromic catgut. One cigarette drain and one split rubber tube were inserted into the kidney pouch and the wound closed allowing the drainage tubes to emerge from the external angle of the wound.

Discussion of the Case—This case represents biliary tract disease where the process is no longer confined to the gall

perature becomes subnormal. The only treatment which will give these patients permanent relief is the return of their bile flow into the duodenum. One such patient in our experience continued to have clay colored stool in spite of clamping of the T tube. She recovered rapidly when the tube pulled out of her duct as she was turning in bed. The tube was found to have a kink in the lower intraductal portion which obstructed the bile flow into the duodenum so that it all drained externally.

In the treatment of both types of liver shock we have found the best results from the continuous or frequent injection of 10 per cent glucose solution intravenously. In the routine treatment of all cases of biliary obstruction we give glucose 5 per cent by proctoclysis and hypodermoclysis. Insulin is also given with the glucose in many cases. Transfusion is the only other procedure which seemed to give any improvement in these patients.

Case V—M. C. age fifty seven. This patient was taken sick five weeks before admission when she first noticed jaundice and pain in the back just above and to the right of the umbilicus. Since that time the jaundice has gradually deepened and she has lost 20 pounds in weight. Her appetite became very poor and she is unable to eat any fatty food without discomfort. She never had any sharp attacks of upper right quadrant pain previously. She has had considerable itching.

Physical Examination—Blood pressure 130/75 temperature 98.3 F pulse 88 respiration 20. The patient is a poorly nourished white female deeply jaundiced. There is slight tenderness but no rigidity on examination of the upper right quadrant of the abdomen. The liver edge is plainly palpated extending below the costal margin on inspiration. Slight tenderness was also found in the costovertebral angles. Other findings were not significant. Van den Bergh direct immediate indirect 9 units. Coagulation time two to five minutes. Stools no bile pigment. Urine urobilin and bilirubin. The diagnosis of carcinoma of the head of the pancreas was made.

Operation —Posterior splanchnic and local anterior abdominal wall block anesthesia. The abdomen was opened through a transverse incision which continued upward through the rectus to give sufficient exposure. Walling off the field of operation with gauze sponges a markedly distended gall bladder and common duct were exposed. With a finger in the foramen of Winslow a firm mass could be palpated in the region of the head of the pancreas but no stones could be demonstrated. The gall bladder was then evacuated of thick tenacious bile using the aspirator. The organ contained no stones and the walls were thin. A purse string suture was then inserted about the opening in the gall bladder and tied firmly about a small mushroom catheter. A cholecystoduodenostomy was then performed by the method suggested by Muller inserting the catheter down the duodenum through an opening which was closed by a purse string suture and completing the procedure with a row of seroserous sutures. A small rubber tube was inserted for drainage and the wound closed about the tube.

Discussion of Case —In cases of biliary obstruction due to extraductal pathology the logical operative procedure is one which will relieve the obstruction by the quickest and simplest method. The operation should deliver the bile into the duodenum the normal situation for its physiologic activity rather than into the stomach. For this reason a cholecystoduodenostomy is performed in every case in which it is technically possible to do so. The method described by Muller is rapid simple and in our hands gave good results. If the gall bladder is so diseased as to make it useless for drainage we have performed a choledochoduodenostomy by the same method using a T tube in the common duct instead of the mushroom catheter. The operation of cholecystogastrostomy is only used when the duodenum is so situated as to be inaccessible.

Postoperative Course —The patient was given the usual postoperative treatment. The jaundice decreased rapidly. Six days after operation the urine contained no bile pigments and the stools were of normal color. She was discharged eighteen days after operation with only a slight yellowish tinge noticeable

in the conjunctiva. The patient died three months after operation of carcinoma of the pancreas having had no return of jaundice and no pain until four days before death.

Experimentally cholecystanastomoses have always resulted in cholangitis and hepatic infection. This does not always obtain in the human patient. In fact it has been reported so seldom that it cannot be used as an argument against the practice. For the obstruction due to cancer of the pancreas internal fistulae have prolonged life from weeks to two years. A case in our hands developed cholangitis and death seven months after operation.

Splanchnic Anesthesia for Biliary Tract Surgery—The experimental results of Rosenthal and Bourne showing the effects of general anesthesia upon liver function had long been anticipated. The ill effects of ether had been noted especially in those patients with biliary obstruction. They were unable to bear well the long and deep anesthesia necessary for the completion of their operations. Gas anesthesia alone does not give sufficient relaxation especially in the fat thick necked type of individual to allow the operator to proceed with ease and dispatch. In an effort to find an anesthesia which would give adequate relaxation without postoperative shock splanchnic block was tried. For the past few years this method of anesthesia has been used for practically all of the jaundiced patients as well as for many operations on the biliary tract in patients without jaundice. The posterior method of Kappis was used in all but a few cases. Kappis and Newmann demonstrated that the abdominal organs having sensation are the mesentery the lesser and greater omentum the bile ducts and hilus of the liver the hilus of the kidney and in the neighborhood of the large vessels. These organs are supplied by sensory fibers from the greater and lesser splanchnic nerves. The splanchnic major arise from the sixth seventh eighth ninth and sometimes the fifth and tenth dorsal nerves and goes downward to enter the abdomen between the crura of the diaphragm. The splanchnic minor arises from the tenth eleventh and twelfth dorsal nerves and enter the abdomen by piercing the dia

phragm. These nerves lie in close proximity to each other in the retroperitoneal area upon the psoas muscle on each side. The fibers from both sides help to form the semilunar ganglion which lies about the celiac axis, the renal plexus and other sympathetic ganglia from which fibers emerge to supply the upper abdominal organs.

Technic—By the technic of Kappis novocain solution is injected from the back into the retroperitoneal area about the

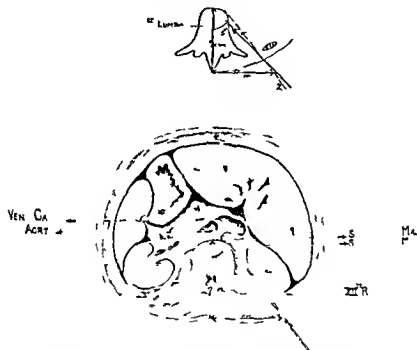


FIG. 282.—Ioster or splanchnic anesthesia. Method of insertion of needle at first toward the body of the vertebra and then tangent to it into the retroperitoneal space.

splanchnic nerves on each side. The injection should be made at about the lower margin of the body of the first lumbar vertebra. The upper portion of the spine of this vertebra locates this level. A wheal is made with a hypodermic needle 7 cm from the midline which usually is at about the lower margin of the twelfth rib. A needle about 6 inches long is used. A 10 cc Luer syringe is attached filled with $\frac{1}{2}$ per cent novocain solution. The needle is pointed at an angle of about 30 to 45 degrees with the

sagittal plane injecting novocain as it is advanced. When the point impinges upon the body of the vertebra the needle is withdrawn 1 or 2 inches and advanced again in a slightly more forward direction. This process is repeated until the needle just passes the vertebral body (Fig. 787). There then remains the distance of the thickness of the psoas muscle through which the needle must pass before the fluid can be injected in the proper place. This distance is on an average about 1 to 1.5 cm. depending upon the size of the patient. The solution should always be injected as the needle advances, because by this means any movable structure especially blood vessels and the peritoneum are pushed out of the way or are caused to be ballooned out in front of the needle. The solution used is $\frac{1}{2}$ per cent novocain containing 4 minims of adrenalin solution to the ounce and from 40 to 50 c.c. are injected into the retroperitoneal space on each side. During the insertion of the needle pain is occasionally experienced by the patient which can be relieved at once by the injection of a little more novocain solution. As the needle is being inserted blood vessels are occasionally entered. To be sure that the injection is being made into the tissues the plunger of the syringe should be pulled back gently at frequent intervals. If blood appears in the syringe the needle should be withdrawn a short distance and inserted again in a slightly different direction. We have never had any complication which we could trace to this cause. As experience is gained in the method there is a certain elastic obstruction to the advancing needle which is recognized as being due to a blood vessel and by heeding this sign most vessels may be avoided.

Disadvantages—1. *Blood pressure fall*. In a considerable percentage of cases there is a fall of blood pressure coming on from fifteen to thirty minutes after injection. The systolic pressure may fall to 80 or 90 mm. of Hg without any marked change in pulse rate. The patient frequently experiences an all gone sensation. Caffein sodium benzoate in 3 grain dose is given hypodermically if the systolic pressure reaches 90 and in every case in our experience a gradual return to the normal pressure has resulted. In order to accurately follow the blood

pressure variations a sphygmomanometer cuff is applied before the injection is made. Readings are made at five minute intervals throughout the operation by the anesthetist.

2 Pain. At times complete anesthesia is not obtained. In these cases a single injection of 10 to 20 c c of novocain solution into the area about the cystic duct or in the gastrohepatic omentum will allow the operator to proceed without causing pain to the patient.

Advantages—The patients following splanchnic anesthesia are sent to their rooms conscious with a normal pulse and blood pressure. Postoperative shock never occurs. Vomiting is a symptom which is seldom troublesome and usually absent. There is no additional strain added to patients who have already lesions of the heart, liver or kidney, therefore splanchnic anesthesia may be used with relative safety for operations on the poor surgical risks.

Contraindications—The only contraindication for splanchnic anesthesia in biliary surgery is an excessively nervous patient. The patient who begs to be put to sleep even before coming to the operating room does not often do well under any form of local or regional anesthesia.

Results—Splanchnic anesthesia has been used in 37 patients operated on for lesions of the biliary tract.

	No. of cases	Duration of anesthesia	Deaths
Cholecystotomy	7	7	0
Cholecystostomy	11	10	1
Cholecystectomy	9		2
Cholecystectomy and choledochostomy	4	7	1
Cholecystostomy and choledochostomy		4	1
Cholecystoduodenostomy	3	3	0
Choledochoduodenostomy	1	1	0
	<u>37</u>	<u>27</u>	<u>3</u>

I Perfect anesthesia
 II Local anesthesia
 III General anesthesia

In this group of patients there were 3 patients to whom gas or ether had to be given in addition to the splanchnic block.

In 3 cases wide spread adhesions were found due to previous operation or inflammation the separation of which caused pain and necessitated general anesthesia. In 2 cases started under splanchnic anesthesia the patients refused to cooperate and gas ether anesthesia was instituted. There were therefore 13.5 per cent of failures. In a like number the anesthesia was completed by the local injection of the novocain solution into the tissues about the common duct or gastrohepatic omentum. There were no deaths which could be attributed to the anesthesia. Four patients died who were operated on under splanchnic block all of them in the jaundiced group.

Case I—Sixty one years old. Jaundice of one month's duration. cholecystostomy. Death twenty days after operation from hepatic insufficiency.

Case II—Sixty five years old. Chronic alcoholic with marked cirrhosis. Cholecystostomy and choledochostomy. Death seven days after operation from hepatic insufficiency.

Case III—Forty years old. Jaundice of five weeks duration. Operation cholecystostomy—no stones found. Bile showed pure culture of hemolytic streptococcus. Death from acute infective hepatitis verified at postmortem examination three days after operation.

Case IV—Thirty seven years old had been jaundiced for four weeks. Preoperative preparation carried out as for jaundiced cases. Operation cholecystostomy and choledochotomy. Death six days after operation from liver insufficiency and secondary hemorrhage.

The best observations of the reactions of patients to anesthesia were from the nurses who care for the patients after operation. Without exception they have confirmed our observations that the convalescence after splanchnic block is smoother and freer from complications than with general anesthesia. We believe that the added time and care spent during the operation is more than repaid by the increased comfort of our patients after operation.

CHANGES IN METABOLISM ASSOCIATED WITH EXPERIMENTAL
BILIARY OBSTRUCTION

L. K. FERCLSON

The cause of the high mortality associated with operations for the relief of biliary obstruction has never been adequately explained. Groups of symptoms have been described and names such as liver shock and hepatic insufficiency have been given to them but the reason for their appearance has never been given in terms of physiology and pathology.

The effects of total removal of the liver have been definitely ascertained by the work of Mann and his co-workers and many studies have been made of the effect of the Eck fistula operation upon metabolic processes. The changes brought about by biliary obstruction however have never received the attention they deserve. This uncertainty has prompted an investigation of some phases of metabolism in an effort to determine what changes if any occur when biliary obstruction is produced.

Experimental Methods—Female dogs were used throughout the experiments. They were fed once daily a standard ration consisting of

Ca cin	5.0 gm	} per kilo of body weight
Meat (ground beef heart)	6.5 gm	
Lard	3.5 gm	
Glucose	5.0 gm	
Bone ash	0.4 gm	
Salt mixture	0.2 gm	
Yeast	0.1 gm	
Water	2.5 gm	

On the days when blood specimens were not taken cane sugar was substituted for the glucose. The dogs ate the feedings well and after seven days of feeding the experiments were begun.

Blood specimens were collected before feedings and at the first second fourth and sixth hours after feedings. Feces were collected for seven days having fed a carmine marker at the beginning and end of the period. Urine specimens were collected for twenty four hour periods. The dogs were catheterized and the bladder irrigated before feedings and the urine passed in

the next twenty four hours collected. To this was added the urine obtained by a second catheterization and bladder irrigation.

When control observations had been made on the normal animals the dogs were anesthetized with ether and under full aseptic precautions the gall bladder was removed and the common duct doubly ligated and sectioned between the ligatures. After a recovery period of five to seven days observations were made as before operation at intervals of about a week until the death of the animal. When the dog did not eat the entire ration the uneaten portions were force fed.

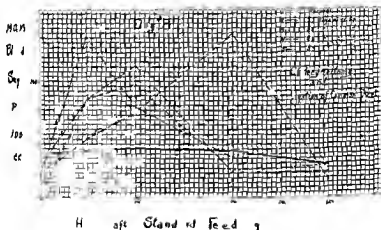


Fig 283

Blood sugar Values — The curves of blood sugar obtained in the control experiments showed at most a very slight rise in the first hour. After the production of biliary obstruction these changes were noted:

- 1 The fasting sugar level fell slightly but rather constantly below the normal.
- 2 The peak of the curve became progressively higher as the duration of the biliary obstruction increased.
- 3 The peak of the curve showed a tendency to be later in appearance (Fig 283).

These findings suggest that there is a progressive loss of the power of glycogen synthesis as the liver damage due to the biliary

obstruction becomes more and more extensive. This fact is further suggested by the relatively low fasting sugar levels which are found. It appears as if the liver no longer stored glycogen in amounts large enough to keep the blood sugar up to the levels ordinarily found.

Protein Metabolism — Urea and Amino acids — Bollman, Mann and Magath in studies in the dehepatized dog demonstrated conclusively that urea formation ceases with removal of the liver and that deamination of amino acids no longer occurs. When they injected amino acids intravenously into animals from which the liver had been removed they were able

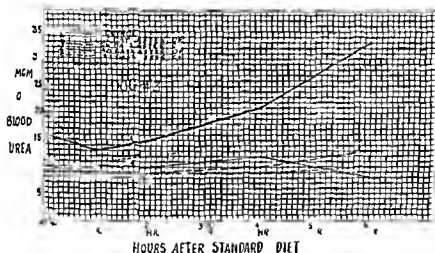


Fig 284

to recover fully one third of the amount administered unchanged in the urine. The remainder could be accounted for by the increased concentration of the acids in the muscles.

The results obtained in these studies with biliary obstruction reflect somewhat the findings in dehepatized animals. As a general rule in the normal animal the blood urea values rose gradually from the fasting level to reach the highest point four to six hours after feeding. After the production of biliary obstruction the curve gradually decreased so that after forty to fifty days the curve approached a straight line (Fig 284).

The amino acid values of the blood showed no constant varia-

tion after biliary obstruction. However the amount excreted in the urine increases gradually as the duration of the jaundice increased (Fig. 285).

Although the findings are not nearly as conclusive as those obtained after removal of the liver they at least suggest that with biliary obstruction an impairment of that hepatic function occurs which has to do with deamination and urea formation.

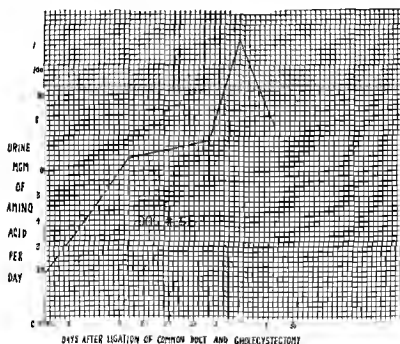


Fig. 285

Uric Acid—The Mayo workers have shown that the destruction of uric acid in the dog depends on the liver. Soon after hepatectomy the blood uric acid rises associated with a marked increase in the urinary excretion. They have also noted that in the later weeks of obstructive jaundice the blood uric acid frequently rises. The amount of uric acid excreted in the urine they found increased only in the later stages of obstructive jaundice without any apparent relationship between the duration of the obstruction.

In these experiments there was no constant variation in the blood uric acid values before and after common duct ligation. In general the findings were usually slightly higher than

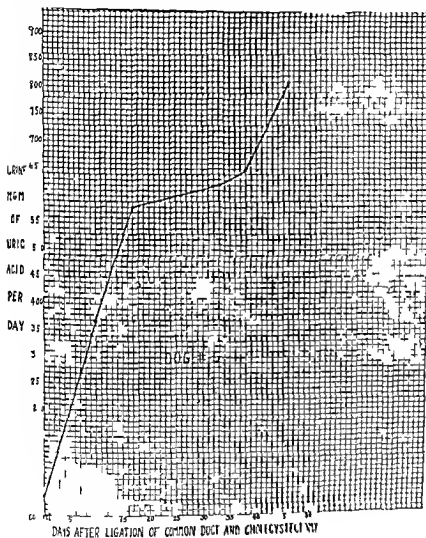


Fig. 286

the normal and on several occasions there was a marked rise before death a finding previously noted by Rollman and Mann.

The uric acid excretion in the urine increased rather constantly as the duration of jaundice became longer (Fig. 286). On the same diet dogs which normally excreted 50 to 60 gm

of uric acid per day after biliary obstruction would excrete gradually increasing amounts until at the end of six to seven weeks of jaundice from 750 to 800 gm could be found. The chart shown was the most striking example (Fig. 286). It seems evident that the ability of the liver to destroy uric acid in the dog is early and markedly impaired by obstructive jaundice.

The non protein nitrogen and creatinin of the blood showed no marked change after the production of biliary obstruction.

The determination of the nitrogen content of the feedings and the dried feces permitted an estimation of the amount of protein digestion and absorption. The normal animals showed a coefficient of protein digestion which averaged 93 to 95 per cent. The production of biliary obstruction reduced this percentage very slightly—so slightly that we may be permitted to believe that protein digestion and absorption is very little affected by the absence of bile from the duodenum.

Fat Metabolism — Blood fats and Cholesterol — Blood fats and cholesterol were estimated on two dogs by the method of Bloor. The series is too small to show anything more than suggestive results. The data for one dog are shown in Table 1.

TABLE 1

	Blood fat					Cholesterol				
	mg. per 100					mg. per 100				
	1	2	3	4	5	1	2	3	4	5
Control	170	135	130	140	155	135	120	120	140	13
	10	180	185	155	165					
4 weeks of obstruction	385	350	325	330	320	320	240	245	200	20
7 weeks of obstruction	90	125	140	138	148	160	10	165	145	16
9 weeks of obstruction	130	135	140	141	14	160	165	10	168	148

There appears to be an increase in the blood fats and cholesterol during the first four or five weeks of obstructive jaundice which gradually falls to the normal level as the duration of the

jaundice increases. An analysis of the feces by the ether extraction method shows that the normal dog absorbs from 90 to 95 per cent of the fat fed. After the production of biliary obstruction from 20 to 30 per cent of the fat fed may be recovered in the feces. An examination of the body after the death of the animal shows almost no fat. The omentum, the perirenal region and even the heart are lacking in their former fat stores.

These facts would seem to suggest that in biliary obstruction although there is decreased digestion and absorption of fatty foods, the fat of the blood is maintained at about the normal level by the mobilization of fat from the various fatty deposits.

Discussion and Summary—In an effort to partially explain the meaning of one type of hepatic insufficiency in terms of disturbed physiology, a study has been made of certain phases of metabolism before and after the production of biliary obstruction. These studies would seem to show that there are certain deviations from the normal which are definite and marked while other changes are observed which are less definite but are suggestive in the light of the findings obtained in dehepatized animals.

The definite changes occurring after biliary obstruction include

1. A constant progressive decrease in sugar tolerance associated with a lowered fasting blood sugar level suggesting a decrease in the ability of the liver to normally form and store glycogen.

2. A marked increase in urinary uric acid excretion due probably to an impairment of the function of the liver which has to do with the destruction of uric acid and

3. A definite decrease in the digestion and absorption of ingested fat associated with a loss of the body fat stores but no decrease in blood fat values. This finding suggests that the animal with obstructive jaundice utilized his own body fats to complete his caloric requirements and to maintain the blood fat within normal levels.

The less definite but suggestive finding obtained after the

production of biliary obstruction is an impairment of the function of the liver to form urea and to deaminize amino-acids as evidenced by

- (a) Lowered blood urea curves after feeding and
- (b) Increased amino acid excretion in the urine

No marked change was found in the non protein nitrogen or creatinin of the blood. The amount of protein digestion and absorption showed little change after the production of obstructive jaundice.

These facts may have some bearing on the clinical treatment of patients with obstructive jaundice. They suggest the advisability of giving these patients at frequent intervals carbohydrates in some form by mouth, vein or rectum to maintain the blood sugar level because of a probable lessened ability of the liver to form and store glycogen.

Protein foods may be fed because they are digested and absorbed almost as in the normal animal but fatty food are not well digested and may be withheld because the body is able to make up its caloric requirements from its own stores.

CLINIC OF DRS DAMON B PFLIFFER
AND CALVIN M SMITH JR

METHODIST EPISCOPAL AND ABINGTON MEMORIAL HOSPITALS

CARCINOMA OF THE COLON

Case I—A woman age sixty six was admitted to the Abington Memorial Hospital May 22 1921 suffering from obstruction of the bowels. She had been unusually strong and active having been a champion golfer for many years. About seven years previously the gall bladder had been removed for cholelithiasis. However the digestive troubles of which she complained namely indigestion flatulence occasional epigastric distress and constipation did not entirely disappear following this operation. She was accustomed therefore to abdominal discomfort and being of somewhat stoical temperament in respect to physical ailments she paid little attention to what was evidently the early symptoms of her present complaint. Looking backward she recalled that about four months prior to this time she became aware of a definite change in bowel habit. Constipation gradually increased requiring more cathartics. Occasionally sharp colicky pains were noticed in the lower abdomen. About three weeks ago these symptoms became greatly aggravated. She took large doses of cathartics and noticed borborygmi and colicky pains. She consulted her physician who suggested an x-ray study but she was in the midst of an interesting golf tournament and continued to play. Stools now were often loose and semiformal. She never observed blood. Today the pains became much more severe she vomited five or six times. She had lost about 10 pounds during the past month but her appetite was good and she did not look sick. Blood pressure systolic 174 diastolic 95. The abdomen is slightly distended slightly tender over lower half no masses.

palpable. During the day she had passed about 3 ounces of fluid feces by rectum and a small amount of gas. Enema was ineffectual. Temperature 98.3 F, pulse 86, respirations 24, hemoglobin 90 per cent, red blood cells 4,400,000, white blood cells 14,000, blood sugar 90 mg, blood urea nitrogen 21 mg, creatinin 1.6 mg, chlorids 214.5 mg per 100 c.c.

The condition was recognized as obstruction and thought to be due to a tumor of the large bowel. As nothing could be felt it was decided to give a bismuth enema cautiously under the fluoroscope in order, if possible, to localize the site of obstruction. This was done and bismuth could be observed to fill the rectum and lower sigmoid, finally being checked at a point in the right iliac fossa just internal to McBurney's point. The radiologist reported that he could not dislodge the point of obstruction by palpation and it was suspected therefore that the obstructing mass had become adherent. For this reason, in spite of the fact that the obstruction was evidently in the sigmoid, it was decided to open the abdomen on the right side for exploration and preliminary colostomy. This was done through a McBurney incision, enlarged sufficiently to admit the hand. The mass, half the size of the fist, was felt just below the promontory of the sacrum in the position indicated by the x-ray, but was not adherent. Evidently it could not be moved by palpation because of the abdominal distention and impossibility of palpating deeply enough to affect the contents of the true pelvis. There seemed to be but little infiltration of the mesentery. The liver could not be satisfactorily palpated on account of adhesions, apparently the result of the previous cholecystectomy. Such portions of the liver as could be felt, however, were of normal consistency and contained no nodules. Both large and small intestines were much distended and it was decided therefore to make a colostomy using the ascending colon. It was necessary to mobilize this portion of the bowel to some extent before it could be brought up to the wound. A rubber tube was then placed through the mesentery beneath the bowel and the wound closed snugly up to that point. It is my belief that a colostomy of this sort is preferable to cecostomy when it is intended to

make a resection at a later stage. A cecostomy relieves the obstruction it is true but the fecal stream is not entirely diverted so that the general manifestations of obstruction and the inflammation of the wall of the bowel immediately proximal to the growth are slower in subsiding and at no time is it possible to clear the involved segment of fecal material so as to deal with a relatively clean structure at the time of resection. Moreover after resection the anastomosis must begin to functionate at once which increases to some extent the possibility of post operative infection in this neighborhood. On the other hand it is not always easy to make a satisfactory colostomy in the ascending colon unless it possesses a definite mesentery which is not often the case. Mobilization must be sufficient to allow the bowel to come up freely or if this does not seem favorable it is best to use the transverse colon bringing it out through a small separate incision in the right rectus well away from the subsequent field of operation. Under no circumstances should the descending colon be used on account of difficulties which such a situation will later impose on the surgeon in his attempt to resect the adjacent area involved by the growth. Of course if the growth is situated at the level of the pelvic floor the requirements of completeness may demand a permanent abdominal anus in which case it is preferable to employ the descending colon or upper sigmoid for the colostomy. Such cases form a separate group from the case under consideration. This case could have been treated by the Mikulicz procedure had it been known in advance that the growth was situated at the apex of the sigmoid and not adherent. It is however less of a procedure to carry out a simple colostomy and leave the question of disposal of the growth to a later stage after the patient has well recovered from the effects of the obstruction itself. If the patient shows the general toxic effects of obstruction a colostomy only should be done in any case. Also while it is true that an anastomosis of the large intestine within the abdomen is never so safe from the standpoint of the possibility of infection as the first stage of the Mikulicz procedure there is a certain advantage in being able to resect not only the bowel but a large

area of potentially involved lymphatics with the certainty that by mobilization of the bowel above and below it will be possible to reunite the intestine without tension

In this case after the first day the colostomy functionated satisfactorily and the patient was soon out of danger so far as the obstruction was concerned. As it frequently happens under these circumstances the obstruction itself diminished so that a small amount of the residual fecal material in the colon began to be passed by rectum. Irrigations were then employed from below and served to cleanse the lower segment.

Twelve days later under ether anesthesia the abdomen was reopened through a left paramedian incision and the entire left colon mobilized from the splenic flexure to the lower sigmoid. No definite glandular metastases were discoverable. The inferior mesenteric artery was located the sigmoid arteries found tied at their origin and cut and the mesentery incised toward the bowel above and below the growth so as to include the whole vascular and lymphatic supply of the sigmoid. About 4 inches of the bowel below and 6 inches above the growth were removed the bowel being cut between clamps with a cautery and the ends sterilized. An over and over inversion suture was then placed clamps removed and each end closed without risk of contamination. Lateral anastomosis was then made using two rows of suture the outer of bees wax silk the inner of No 0 chromic catgut. The opening was $2\frac{1}{2}$ inches in length. The corner of the omentum was tucked about the anastomosis and the abdomen closed without drainage.

Except for the usual postoperative rise of temperature and pulse there were no unpleasant sequela and recovery from this stage of the operation was rapid.

Eighteen day later under local anesthesia the colostomy was closed without opening the peritoneum. Two small strips of rubber dam were placed in the upper and lower angles of the incision through the aponeurotic and muscular layers but not brought in contact with the intestinal suture. The wound suppurated mildly but there was no fecal fistula and in two weeks healing was complete.

Recovery was complete and at the present time patient is in perfect health

Case II—A woman age forty eight was admitted to the Abington Memorial Hospital December 4 1925 complaining of severe abdominal pain and diarrhea Fifteen months previously she had first observed looseness of the bowels with occasional pains Prior to this time she had been regular with a slight tendency toward constipation There was no blood or mucus in evacuations She consulted her physician who told her she had colitis Medicine was prescribed and the patient paid little attention to the recurring pains About seven months later she noticed she was losing weight although her appetite was good In August a year after onset her appetite began to fail Attacks of pain were now more frequent and violent Bowel movements were loose but scanty and contained much mucus and flatus She consulted a gastro enterologist who referred her to a radiologist for examination and receiving a negative report again made a diagnosis of colitis

Ten days ago she had a severe attack of cramps and on this occasion consulted Dr Cross of Abington who sent her to the hospital for investigation At this time she had lost about 80 pounds although she still gave the appearance of being well nourished and her color was good Hemoglobin 85 per cent red blood cells 4 500 000 leukocytes 8300 The abdomen was considerably distended and there were no masses or tender points An x ray revealed numerous loops obviously greatly distended and filled with gas The large intestine particularly the cecum and ascending colon was greatly distended

To verify the diagnosis of obstruction and localize the site a bismuth enema was given which showed a marked constriction in the sigmoid The patient insisted on going home as soon as the enema had been given stating that she would return if necessary During the night of December 3d the symptoms became much exaggerated and it was obvious that obstruction had become practically complete

Comment—The large proportion of cases of carcinoma of the

colon which are treated for a considerable period of time under the diagnosis of colitis should make every physician wary of the diagnosis until every effort has been made to rule out neoplasm. Another point which this case well illustrates is the necessity of investigating the colon by bismuth enema and not being satisfied with the routine gastro intestinal examination in which the opaque mixture is swallowed and followed during its passage downward through the tract. It is well but not generally known that this method frequently fails to reveal even well advanced obstructions in the large intestine. On the other hand bismuth watched fluoroscopically during its ascent and checked by films will almost invariably detect such an abnormality. In this case the absence of obstructive toxemia inspired the hope that it would be possible to relieve the obstruction and remove the growth by the Mikulicz procedure carrying out the first stage at the primary operation. At the expiration of such a considerable period from the onset of the disease and in view of the great loss of weight it seemed hardly likely that the patient should have escaped metastasis and therefore the most that could be reasonably expected would be to remove the growth, re-establish the continuity of the bowel by this relatively safe procedure which might give the patient a considerable period of satisfactory existence. On exploration however contrary to expectation the liver was found to be entirely free from nodules. The growth which was situated near the apex of the sigmoid loop was still free and unattached to the surrounding viscera. The mesentery contained a considerable number of enlarged glands. The large intestine was enormously distended and the descending colon purplish in color. The entire descending colon, sigmoid and splenic flexure were mobilized and a point on the inferior mesenteric artery selected which marked the upper limit of obvious lymphatic involvement. The left colic artery was tied at this point and the mesentery incised toward the bowel freeing a V shaped portion of the mesentery and subtending an arc of the sigmoid and descending colon about a foot in length which contained the growth. A muscle splitting incision in the belt line and just external to the

semilunar line was then made and the loosened segment of the bowel with its mesentery drawn through. The entering and out going loops of the colon were sewn together for a distance of $2\frac{1}{2}$ inches just below the point of emergence from the abdominal cavity in accordance with the well known technic of Mikulicz. The original incision was closed without drainage and the McBurney incision partly closed to fit snugly about the exteriorized bowel. This was then washed with ether and thoroughly dried and the incision thickly covered with zinc ointment. The lower portion of the loop was then cut between the clamps with a cautery and the clamps left on the bowel. Into the upper loop a Pauls tube was fixed in order to provide immediate drainage. A large amount of gas and liquid contents immediately escaped. Convalescence from this stage was without incident. Twelve days later with a Kocher clamp the cutting of the spur was begun. This occupied about a week, it being necessary to take a second bite in order to cut the spur to the proper depth. Two weeks after the completion of this stage under local anesthesia supplemented by gas on account of the patient's nervous condition the bowel was dissected free, repaired and placed within the abdomen. The abdominal wall was repaired in layers with interrupted stitches with a small drain in the lower angle. There was no suppuration.

It is interesting to note that this patient at the present time two years and four months after operation is in perfect health and has regained her weight showing no evidence of recurrence. Pathologic diagnosis was adenoma carcinoma with metastasis to the glands of the mesentery. This case emphasizes the relatively benign character of many cases of carcinoma of the left half of the colon. These 2 cases are good examples of the alternative methods to be employed in growths in this situation. In both cases from a technical standpoint it would have been a simple matter to excise and make an anastomosis in one stage but the hazards of such a procedure are well recognized at the present time. These hazards do not depend upon manual dexterity or mechanical factors but upon conditions inherent in the operation of anastomosis under such conditions. One can

not count upon satisfactory union however skilfully the operation is performed and as Moynihan has well stated there are few rules so binding upon the surgeon as the avoidance of an anastomosis in the presence of obstruction. However the result may be achieved with great safety by either of the two plans illustrated above. Either prebminary colostomy relieves the obstruction and enabling the subsequent resection and anastomosis to be performed in a relatively clean field upon tissues of good vitality and freed by the colostomy from the necessity of early function or by the Mikulicz procedure. The first stage of the latter operation may be carried out without danger of primary infection or subsequent necrosis and the succeeding steps are practically devoid of mortality. If obstruction is early and general symptoms and signs of toxemia absent the choice is made by the mechanical condition bearing in mind that the object of the operation is to remove not only the growth but the regional mesentery. The location of the growth and the possibilities of mobilization of the affected mesentery will decide. In general wider excision may be made within the abdomen by the Mikulicz procedure. On the other hand the danger of infection though slight is greater with the former procedure. In the absence of statistics capable of setting the exact uses and limitations of the two methods it is my own feeling that an impartial attitude should be maintained by the surgeon letting the conditions general and local decide the matter in the individual case.

CLOSURE OF FECAL FISTULA FOLLOWING CECOSTOMY FOR ENTERITIS WITH TUBERCULOUS APPENDICITIS AND TYPHLITIS

THIS patient a woman of twenty six years first came under my care in August 1926 at which time she was transferred from the medical service. She had been admitted several weeks before because of an uncontrollable diarrhea associated with fever and loss of weight. There was a history of pulmonary tuberculosis which had never been very active and she had enjoyed fair but never robust health. The onset of the diarrhea had been sudden and attributed to dietary indiscretion. The usual remedies had no effect whatever in controlling it and when she finally was transferred to the surgical side she was having forty movements a day and weighed 60 pounds. Her weight prior to the present illness has been 101 pounds. Gastro intestinal x ray examination was strongly suggestive of colitis but no obstructive lesion was seen. Proctoscopic examination was negative except for a mild proctitis due to the diarrhea. Repeated examinations of the stools were negative for amebæ or other parasites. We advised that a cecostomy be made and on August 16th under local anesthesia the abdomen was opened through a muscle splitting (McBurney) incision. On opening the peritoneum a small amount of clear straw colored fluid was found. The cecum and the appendix were delivered without difficulty the appendix was red thick and studded with small nodules strongly suggestive of tuberculosis. There was a mass in the cecum the size of a small lemon involving the base of the appendix. The patient's condition did not warrant resection of the cecum and after removing the appendix a cecostomy was made following the Stamm Kader technic. The patient left the operating room in good condition. Microscopic examination of the appendix confirmed the diagnosis of tuberculosis.

Following the operation irrigations with silver nitrate (1:3000) were given through the catheter every second day

The improvement in the patient's condition was striking particularly as regards the diarrhea which was brought under control almost immediately. The irrigations were continued for three weeks at the end of which time the patient was having one bowel movement a day by rectum. Unfortunately the wound broke down and the catheter came out of the cecum. A fecal fistula developed but the bowels continued to move by rectum. Six weeks after operation she was discharged having improved a great deal and having gained 10 pounds.

Since leaving the hospital she has been under the care of Dr Armin Stecher who has treated her with heliotherapy. The technic followed is that advised by Lawrason Brown: a daily exposure to the mercury quartz lamp increasing the time exposure daily up to twenty minutes. She has been very faithful in reporting for treatment and under this plan her weight has been brought up to 115 pounds, this is her best weight and she says that she has never felt better in her life. She still has a fecal fistula and it is for the closure of this that she comes to us now. It is eighteen months since the first operation and I confess to a considerable hesitancy in undertaking this procedure as the fistula is small and I am not at all sure that the operation will be successful. All of this has been carefully explained to the patient but she still elects the risk. She has developed the mental attitude so commonly seen in these cases and imagines that she is objectionable to other people. This is a social and not a surgical matter but it is of extreme importance to the patient.

We will use nitrous oxid anesthesia and before going further I am going to make an incision through the skin surrounding the fistula and sew the inner edges together with No 10 silk. This will help to reduce contamination of the wound. We will also change our gloves. Now I am dissecting the fistulous tract and you see that as the deep fascia is approached we find the cecum firmly adherent to it. The fistula is small but fairly long and fortunately I am able to isolate the opening in the cecum without freeing it from the abdominal wall. I am now closing the defect in the cecum with a Connell stitch which will be inverted with a

Cushing Lambert suture later. You will observe that absorbable sutures are being used for both rows—a plan to which we are now absolutely committed in intestinal suture. Now that the cecum is closed I feel justified in freeing it and entering the abdomen. I am very anxious to see what effect the quartz light treatment has had on the mass in the cecum. The cecum is now completely delivered and I fail to find the slightest evidence of any mass or of any tuberculous peritonitis. The uterus and adnexa are free of any involvement as they were at the first operation. There is no fluid present. This is a very gratifying result. In order to further insure the permanent closure of the cecum I am going to introduce another row of sutures. The abdomen will now be closed with interrupted sutures of chromic catgut in the peritoneum and fascia and silkworm gut in the skin. As there was inevitably some contamination of the wound a small strip of rubber dam will be inserted into the angles as a precautionary measure.

Comment—Tuberculosis of the cecum is a condition concerning which many surgeons have changed their ground in recent years. It is not very uncommon but unfortunately the diagnosis is not simple. Many cases are diagnosed chronic appendicitis and for this there is some excuse; however what too often happens is that the condition is still not diagnosed when the patient is operated upon and is only recognized when appendicectomy fails to relieve the symptoms. There is no doubt but that careful preoperative x-ray studies would prevent this mistake in many cases. The x-ray however is not infallible and you will recall that it did not help in this case. In the past resection of the cecum followed by ileocolostomy was the method of treatment but the more recent observations of Brown and his associates on intestinal tuberculosis have caused many of us to change our minds about this. This girl of course had her original focus (as far as the intestinal tract is concerned) removed in the appendix but undoubtedly the quartz light aided materially in clearing up the cecal condition. I do believe however that without the cecostomy the enteritis would have proved fatal. Finally in case of tuberculosis of the cecum we

feel that it is always best to make sure of the diagnosis by incision and inspection rather than to make it by inference. It is better to subject a patient with tuberculosis of the cecum to a possibly unnecessary operation than to overlook that which is much more common namely carcinoma. In a series of 48 tumors of the cecum reported by Friedman in 1921 only 1 were due to tuberculosis. In large obstructive tuberculous tumors we believe cecectomy or if this is not practical exclusion by ileocolotomy to be the method of choice.

Note—This patient had an uneventful convalescence and was discharged three weeks after operation with the fistula completely closed. She reported for examination on February 28th one month later at which time she weighed 116 pounds and had a perfectly solid wound.

ULCER OF THE SECOND PORTION OF THE DUODENUM POSTERIOR GASTRO ENTEROSTOMY

THE next patient is a girl of nineteen years whose chief and in fact only complaint is pain in the navel. I first saw her about six months ago at which time she gave a history of epigastric pain of three years duration. The pain at first had no apparent relation to food but gradually changed in character until it came on definitely about two hours after eating. It was never relieved by food or by alkalis; there has never been any vomiting, gaseous eructation, heart burn or the other common symptoms of gastric disturbance. She has never been jaundiced. The past history is entirely negative.

The physical examination at the time I first saw her was essentially negative with the exception of tenderness in the epigastric and umbilical regions. There were no masses, no rigidity or appendiceal tenderness.

The blood count showed hemoglobin 82 per cent, red blood cells 4,200,000, white blood cells 8100. A gastric analysis revealed nothing that could be considered in any way pathologic. The urine was negative. The blood Wassermann was negative.

Gastrointestinal x-ray revealed a rather marked viscerop-tosis. There was some evidence of pyloric spasm but no gastric retention at the end of six hours. In the lateral position the duodenal cap distended in a tent-like manner but there was no consistent deformity and the cap was normal when the patient lay flat. The appendix was not visualized. The twenty-four hour plates revealed a large redundant sigmoid with some retention in the cecum and descending colon. The transverse colon was below the iliac crest. The roentgenologist was inclined to disregard the duodenal deformity.

In view of the essentially negative findings the patient was fitted with a suitable support (Curtis belt) and placed on the usual regime for ptosis. She was seen from time to time and in spite of very good cooperation on her part there was not only

no improvement but the pain became worse. The operation which I am about to do is in the nature of an exploratory one although I cannot but feel that there is something more than ptosis to account for this pain.

As the symptoms are most suggestive of upper abdominal disease I am making a high paramedian incision. The stomach appears normal; there is no enlargement; the pylorus is patulous and shows no evidence of ulcer. The gall bladder appears perfectly normal. The first portion of the duodenum is negative but here, low down in the second portion, you will note a depression. This is hard and indurated—it is a little more than 1 cm. in diameter. There is no apparent obstruction and no adhesions. As this ulcer is situated on the lateral aspect and is placed nearer the posterior than the anterior wall, I do not believe that it is advisable to excise it. I will therefore be content to do a posterior gastroenterostomy with every reasonable expectation of a cure. This is the Mayo antiperistaltic type of anastomosis and you will note that we are using absorbable suture material just as in the fecal fistula case. The anchoring of the anastomosis and the closure of the opening in the mesocolon are of great importance. We have recently reported a case in which failure to observe this precaution resulted in herniation of the entire small intestine into the lesser peritoneal cavity with subsequent perforation of the gastrohepatic omentum.¹ Of course any operation for duodenal ulcer is incomplete without removal of the appendix. The cecum in this case is easily deliverable through the upper abdominal incision but in cases where this is difficult it is better to make a small McBurney incision than to do a great deal of pulling and tugging in order to get everything done through one incision. The appendix is diseased; it is thick, red and contains 4 concretions. She will be much better off without it. I find no evidence of further pathology and the abdomen will now be closed without drainage. The patient will receive 1000 cc. of salt solution by hypodermoclysis as soon as she reaches her room and will be allowed sips of water at the end of eight hours if there is no

vomiting Soft diet is allowed on the third or fourth day according to the condition at that time

Comment—There are several interesting features in this case. The negative x ray examination is not unusual in low ulcer of the duodenum and illustrates the fact that one must not be guided altogether by such a report. Evidently the tent-like deformity of the duodenal cap was of some importance. The gastric analysis did not help at all. We were led to operate upon this patient for several reasons: there was no question that she had pain. She was not at all neurotic and to have dismissed her with the statement that there was nothing the matter would have been unreasonable as no sane sensible person comes to a physician if there is nothing the matter. All of the ordinary clinical and laboratory examinations failed to satisfactorily explain the pain and operation seemed the only thing left in order to clear up the diagnosis. The patient was fully aware of all this and requested operation. This type of ulcer which Balfour has spoken of as ripe is not amenable to medical treatment: there is every evidence of chronicity present. We believe the expectation of cure from gastro enterostomy is well founded in this case. The reports from the largest surgical clinics indicate that in duodenal ulcer gastro enterostomy produces from 80 to 90 per cent of cures. With these results there would seem to be little justification for subjecting our patients to the radical procedures which have been recommended by some surgeons. Finally it seems worthwhile to call attention to the fact that the symptoms of which this young woman complained might possibly have been attributed to chronic appendicitis. With this in mind if the appendix had been removed through a small McBurney incision it would have shown enough pathology to confirm such a diagnosis. The patient would have been no better. It has become fashionable to speak of so-called chronic appendicitis and to infer that there is no such condition. The failure of appendicectomy to relieve these cases is often cited. Naturally removal of the appendix will not cure duodenal ulcer: neither will it cure cholecystitis or ureteral calculus but this does not mean that chronic appendicitis is a

myth and that all of the cases so diagnosed are something else. The unquestioned relief of such conditions as reflex gastric disturbances, chronic constipation, etc., by the removal of a chronically diseased appendix in a host of cases bears witness to this. We do agree, however, with those who insist that the urinary tract and the upper abdomen be carefully scrutinized before a diagnosis of chronic appendicitis is made.

CLINIC OF DR THOMAS A SHALLOW

REPORT OF CASES FROM THE J CHALMERS DaCOSTA CLINIC HOSPITAL OF THE JEFFERSON MEDICAL COLLEGE

FOUR CASES ILLUSTRATING SYMPTOMS DIAGNOSIS AND TREATMENT OF SPINAL CORD COMPRESSION

- I. DERMOID CYST OF THE CAUDA EQUINA
- II. INTRAMEDULLARY TUMOR OF THE CERVICAL SPINAL CORD
- III. POSTTRAUMATIC ARACHNOIDITIS
- IV. ENCYSTED ARACHNOIDITIS

ONE is too apt to think of chronic compression of the spinal cord as being caused only by tumors and loses sight of the fact that encysted cerebrospinal fluid will cause the symptoms of spinal cord tumor so clearly that it is impossible to distinguish between the two conditions

Case I Dermoid Cyst of the Cauda Equina—Patient J P a white male thirty years of age occupation carpenter was referred to the DaCosta Clinic by Dr Thomas Stellwagen with the following history

Chief Complaint—Retention of urine This symptom has been continuously present for the past year His general health was good until some years ago (1919) when he had malarial fever and two years later (1921) an operation was performed for acute appendicitis He states that he has had numerous falls in none of which he struck his back the last one in 1922 Following this fall he developed severe pain in the lumbar region and retention of urine It was necessary at this time to catheterize him several times a day for several days At the expiration of this time he was again able to void but the pain in the back persisted although to a lesser degree He was relatively free from bladder symptoms for the next three years when he again

had retention of urine. On this occasion there was no history of a fall. He was treated in various hospitals and dispensaries for retention of urine, being told that he had trouble with his prostate gland. In the course of time he was able to void and he stated that the treatment he received in the way of cystoscopic examinations, catheterization of the ureter and massage of the prostate gland was not beneficial. He presented himself to Dr. Stellwagen for treatment. Dr. Stellwagen examined the bladder, ureters and kidneys. The bladder contained 14 ounces of residual urine. The prostate was normal. During the examination the patient complained of severe pain in the back and Dr. Stellwagen, because of the intense pain which was present and the negative local findings, concluded that the retention was due to spinal cord pathology and not to any local genito-urinary cause.

The patient was admitted to the service of Dr. J. Chalmer DaCosta and complained of the following symptoms. For the past year he has had retention of urine and severe pains in the lower lumbar region which radiated down the back to his legs and was associated with a burning sensation in the calves and thighs of both lower extremities. The pain was aggravated when he coughed, sneezed or strained at stool. There were no urticarial pains present. The pain was localized directly over the fourth lumbar vertebra.

Gait—The patient staggered after getting up from a sitting position or getting out of bed, but when he was well on his feet the staggering disappeared and was replaced by a feeling of weakness in the left leg. He tends to drag his left foot.

Station—Romberg sign is not present. Sensation is impaired on the outer side of both thighs and legs. There is tactile sensory loss on the outer side of each foot. There is diminution of sensation about the anus.

Reflexes—Knee jerks are absent except by the reinforcement test. A diagnosis of tumor of the spinal cord was made. The question arose whether it involved the conus or the cauda equina. In conus tumors there is usually a rapid course and they are not associated with radiating pains down the extremities.

Cauda tumors on the contrary do not run a rapid course and there are periods of remission of the symptoms as were manifested in this case. You will recall the patient had retention of urine in 1922 which disappeared after or within a week. He has



Fig. 28. —Microphotograph low power size showing the general contour of dermoid cyst removed from the spinal cord.

had several similar attacks. Cauda tumors are associated with severe localized pain over the site of the tumor and radiating pains down the back to the leg are the rule. We concluded that this man had a tumor of the cauda equina.

The rectum was not paralyzed

Ray examination did not give us any information concerning the location or the type of the disease with which we were dealing

Lumbar puncture shows clear fluid under pressure 18 mm
No cell count was made



Fig. 288.—Microphotograph, high power, showing a field of modified cysts lined by the thin, flattened, squamous epithelial cells.

Wassermann reaction was negative

I operated upon the patient on September 29, 1925. The dura was exposed. A bulge could be seen beneath the dura opposite the fourth lumbar vertebra. After incision of the dura a yellowish soft mass was seen surrounded by the cauda equina and attached to the lower portion of this yellowish mass was a

small cyst In removing the tumor it was necessary to separate by sharp dissection the cauda from the tumor In the separation of the tumor there was a considerable ooze of blood This was controlled with pledgets of cotton soaked in adrenalin chlorid The dura was sutured with black silk and the muscles and the skin closed without drainage

Comment—This case is valuable from a diagnostic standpoint the patient having been treated for mechanical retention had taken 3000 capsules of hexyresorcin The bladder symptoms showed periods of return of function which is common in tumors of the cauda equina

The laboratory report made by Dr Crawford was a *dermoid cyst* (Fig 287)

Progress—Following operation the patient within a week had complete relief from the pain in the back and legs The legs became stronger and he was able to walk within four weeks and to work without pain or discomfort within three months He had not fully recovered the function of the bladder one year after operation but there was decided improvement We are unable to give a report of the present condition of the bladder He has not reported to the doctor for the past year and we are unable to locate him

Case II Intramedullary Tumor of the Cervical Spinal Cord—The second patient is a married woman twenty eight years of age who was admitted to the Neurologic Service of Professor Edward A Strecker on December 26 1925

At the time of her admission she was totally paralyzed in both arms and both lower extremities She gave the following history In April 1925 seven months before her admission she noticed a weakness in her left arm and hand so that she would always drop objects from this hand on trying to pick them up Two months later in June of the same year she complained of a sticking pain in her left hand along the distribution of the ulnar nerve in the fourth and fifth fingers This was far more noticeable at night after retiring At this time she also was unable to abduct or adduct the fingers In July of the same year

she stated that while walking she fell four or five times. She also noticed that she was losing strength in the left leg. Associated with the loss of strength she said that she had a feeling as though bugs were walking upon the skin of the right leg. This will be observed to be the second stage of spinal cord tumor—the Brown Sequard syndrome—loss of power on the side below the tumor and sensory alteration on the opposite side. Within the course of another month the right leg also showed signs of loss of power and shortly afterward the right arm became weak. She was then compelled to go to bed. After taking to bed she developed jerking in her legs every ten or fifteen minutes. By October of the same year she had become totally paralyzed and presented a picture of complete disability in arms and legs. She retained control of her bowels and bladder.

Examination of the extremities showed wasting of the thenar and hypothenar eminences and wasting of the interosseous muscles of both hands. The fingers of the left hand assumed a curved position with wrist drop. The third, fourth and fifth fingers of the right hand were dropped and totally paralyzed. No reactions of degeneration were noted. Sensation both superficial and deep was entirely lost to touch on both sides. Sensation was lost throughout the entire upper and lower extremities. The deep reflexes were moderately increased (the biceps and triceps of the upper extremities and the patellar of the lower extremities). Bilateral Babinski and bilateral ankle clonus were present. Reflex of abdominal muscles was absent on both sides.

The x-ray findings did not give us any information as to the character or location of the lesion. The Wassermann reaction was negative. There is a moderate amount of anuria. x-Ray examination does not show any bone disease.

This case presents several striking features. First. The total absence of any root pains from the cervical region. Second. The rapid progress to total paralysis in the course of seven months from the time when she was first confined to bed. Third. The Brown Sequard syndrome which was present in July, four

months after the onset of her illness. She had beginning loss of power in the left leg and sensory changes in the right foot.

Diagnosis—Dr. Strecker made a diagnosis of intramedullary tumor of the cervical region of the spinal cord.

The case was transferred to the service of Dr. J. Chalmers DaCosta. Dr. DaCosta saw and showed this patient to the senior class of the Jefferson College. He diagnosed the location of the tumor (first because of the ulnar nerve symptoms marking the onset of the trouble) as originating in the spinal cord at the origin of the eighth cervical and the first thoracic nerves which corresponds to the seventh cervical segment on a level with the sixth cervical vertebra. This location was slightly higher than that made by the neurologist.

I operated on the patient on February 20, 1926, exposing the spinal cord between the fifth cervical and the second thoracic vertebrae. Between the sixth and seventh cervical vertebrae a distinct bulge could be seen beneath the dura. There was no pulsation of the spinal cord over this area. The dura was opened and the tumor was found to be in the substance of the cord, a little to the left of the median line. An incision was made over the most prominent portion of the tumor and the tumor enucleated. Prior to the incision in the cord the patient's condition was poor, the pulse rate having risen to 150. Immediately after the enucleation of the tumor the pulse rate fell to 120 and the woman's condition improved greatly. Hemorrhage was controlled by pledgets of cotton soaked in adrenalin chlorid. The cotton was removed and the dura closed. The wound was closed without drainage.

Subsequent Course—Five days after the removal of the tumor the patient complained of severe girdle pains in the chest and abdomen and severe shooting pains in the legs. Ten days after the operation she was able to differentiate between heat and cold over the entire right leg and the inner surface of the left leg. During the course of this examination both legs were jerking. Six weeks after the operation she was able to move the right leg slightly; the left leg was still paralyzed. Two months later sensation had returned in both legs. April 12th she was

able to be placed in a wheel chair there was sensation and some muscle power in the right arm and to a lesser degree in the left arm. At the end of May 1926 she was able to walk with assistance. The patient was discharged June 1926 able to walk

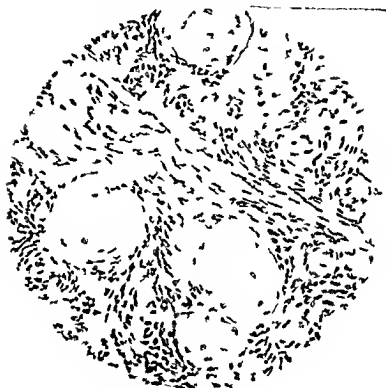


Fig 289—Microphotograph of a section of the spinal cord showing a large area of necrosis and degeneration of the spinal cord tissue. The area of necrosis is indicated by the letter 'L' and the area of degeneration by the letter 'E'. The spinal cord is shown in cross-section, with the central canal visible in the center.

and move her right arm freely but still had some weakness and loss of power in the left arm.

Doctor DaCosta again showed the case before his Clinic on March 30 1928 over two years after the operation. She still drags the left foot the grip is good in both hands. There is still some wasting of the thenar and hypothenar eminences of

the left hand. She has a Babinski reflex and ankle clonus of the left leg. There is no Babinski reflex and no ankle clonus of the right leg. Sensation has returned to the entire upper and lower extremities.

The pathologist diagnosed the specimen received as a *neurofibroma*(?) (Fig 289). Since making this report Dr Crawford is uncertain whether it is an endothelioma or a neurofibroma.

The prognosis in this case seems favorable because of the benign character of the growth and the rapid improvement following its removal.

Case III Traumatic Arachnoiditis at the Level of the Eleventh Thoracic Vertebra—Patient S B male age thirty three years sent from Professor Strecker's clinic to the surgical service of Professor J Chalmers DaCosta. This patient was admitted February 1 1928 complaining of throbbing pain in the lower portion of the lumbosacral region radiating into the left hip weakness of the left leg and foot and inability to arise from a chair or stoop without severe and agonizing pain.

The family and personal history were negative except for an injury which the patient received August 1915 at which time he was in a railroad accident and his chest and back were contused. This accident rendered him unconscious for fifteen hours. At the end of this time he stated that he felt well except for vague pains in the back and legs. He remained in the hospital for five weeks. When discharged from the hospital he appeared perfectly well.

Present Illness—In January 1917 two years after the accident he began to lose power in the left foot. About this time he began to have some backache. There was a gradual decrease in power in the left leg from 1917 to 1921 and at that time he noticed that the left leg and thigh shook so that he was unable to control them. Between the years 1921 and 1927 he was relatively free from pain in the back and was able to go about his business. The only complaint was a limp caused by lack of power in the left leg.

In October 1927 he developed severe pain in the lumbo

sacral region. This pain was aggravated by movement and stooping but while he remained in a recumbent position or sat in a chair he complained of no pain.

In November 1921 he began to have a feeling of pins and needles in the left foot and this was followed by numbness.

The heart and lungs did not show any evidence of organic disease.

The Wassermann reaction was negative and the blood picture was virtually normal.

Examination of the reflexes of the abdominal wall showed absence of superficial reflex on both sides. There were no areas of tenderness nor any root pains radiating from the spine.

His gait was unsteady and he lumped. The left foot dragged along the ground and the left toe struck the ground as he walked. Cremasteric reflex was absent. There was no loss of sensation about the scrotum or the anus. Both patellar knee jerks were plus, the left decidedly more so than the right. He had a bilateral Babinski reaction which was more active on the left foot. Ankle clonus was present in both legs, more marked in the left. There was no sensory loss in the extremities.

Examination of the back showed distinct kyphosis involving the eleventh and twelfth dorsal vertebrae and pain and tenderness were present over this area.

A clinical diagnosis of fracture of the eleventh and twelfth thoracic vertebrae was made. The patient was sent for an x-ray examination.

Dr. Leon Solis Cohen reports that there is a definite left dorsal and right lumbar curvature of the spine, the cause of which is not apparent. The eleventh dorsal vertebra is narrowed in a wedge shaped fashion and its lower border distinctly ridged. Dr. Cohen believes that bone disease is present and that it is traumatic (in all probability an old fracture). He states that the eleventh thoracic vertebra is displaced posteriorly.

The clinical evidence of spinal cord compression and the presence of kyphosis apparent to the eye and the touch led us to make a diagnosis of an old fracture of the spine.

Why should there be symptoms arising at the site of an old fracture eleven years after injury without the intervention of some other cause?

It is true that tuberculosis osteo arthritis or other changes taking place at the site of fracture might cause compression of the spinal cord. But because of the delayed onset and the slow progress of the clinical symptoms we diagnosed the condition as arachnoiditis causing compression.

Dr Gilpin agreed with this diagnosis when he showed the patient to the class in neurology.

Operation was performed by me on February 11 1928. An incision was made over the tenth eleventh and twelfth thoracic and first lumbar vertebrae exposing the laminae of these vertebrae. The eleventh and twelfth laminae were found crushed. There were scar tissue and callus about the parts and I noted that the entire spinal column was deviated to the right placing the spinous processes of the eighth ninth and tenth thoracic decidedly to the right of the median line. After removing the laminae from these vertebrae I observed that the articulation between the eleventh and twelfth thoracic vertebra appeared loose. It was not until the laminae of the twelfth thoracic and the first lumbar vertebrae were removed that we were able to straighten the spinal cord and column. At the level of the eleventh thoracic vertebra there was evidence of new tissue formation which resembled a growth. All of the new growth was removed and sent to the laboratory for microscopic section.

The dura was now exposed between the tenth thoracic and the first lumbar vertebrae. It did not pulsate at the eleventh and twelfth vertebrae and there was a definite bulging over this area. The dura was opened and as the incision was enlarged there was a bulging of a substance which looked like the vitreous humor of the eye or chemosis of the conjunctiva. Further enlargement of the incision showed that this mass was extended as high as the tenth thoracic and as low as the first lumbar vertebrae. There were two distinct transverse bands one in the lower and one in the upper portion running across the spinal

canal which caused distinct constriction to the cord causing a cystic tumor. These bands were divided and the sac at once collapsed. The arachnoid was widely open and the fluid disseminated and immediately the cord began to pulsate. There did not seem to be any evidence of scar formation or any destruction of nerve tissue in the spinal cord.

The dura was closed with fine black silk, the muscles and the skin were closed without drainage.

The patient reacted well from the anesthetic.

Progress—Nine days after the operation he was able to flex his toes normally. He had lost the feeling of numbness in the left foot and there was no tremor in either of the lower extremities. Knee jerks were not so active as they had been before the operation. Ankle clonus was not present in the right leg and was of the disappearing type in the left leg. The Babinski reaction was not present in the right foot and was questionable in the left foot.

The patient was discharged from the hospital wearing a celluloid cast. He was able to walk without pain or discomfort; he had no pain in the back on arising from a chair. The cremasteric reflex was normal, the superficial abdominal reflexes were normal. He still had some spasticity in the left leg; there was no loss of power and no limp. Reactions of degeneration were absent.

The patient was seen April 6, 1928 and has resumed some of his duties.

Comment—This case is of interest because of the long period between the time of the injury and the time of onset of symptoms.

The first manifested itself two years after the accident and was weakness of one of the lower extremities. Six years passed before he showed any signs of irritation of the motor pathway and thus by a shaking and loss of strength. Twelve years passed before he complained of any pain at the site of the injury.

The laboratory report on the tissue removed at the site of the fracture (extradural) was *malignant tumor forming a non-resembling endothelioma*.

Case IV Cyst of the Arachnoid—Patient A M female married and the mother of four children Nothing in the family or personal history of malignant disease

Patient has always been in good health except for an attack of typhoid fever thirteen years ago

She complained of loss of power in both legs inability to walk aching pruns in the lower thoracic region and numbness in the legs

The present trouble had its onset in February of 1926 At this time she began to notice that she had stiffness in the knees and at the same time had sharp shooting pains in the lower thoracic region which went through the back to the epigastrium These attacks of pain were so severe that she fell to the floor in several of them She gradually lost power in her legs and in the course of several months she was unable to walk She has control of her bladder and bowels She has some dysuria occasionally having to strain to void

Physical Examination—The pupils are equal and react promptly to light Eye grounds normal no muscular paralysis The upper extremities did not show any loss of power or any alteration in sensation There was no evidence of focal infection about the sinuses teeth or tonsils Thyroid gland was palpable There was some enlargement of the sub maxillary lymphatic glands They are not painful and are freely movable

Examination of the Chest—The heart is normal in size and does not show any evidence of organic disease of the valves or the muscles

The lungs are clear There is no evidence of tuberculosis

Abdomen—The liver spleen and kidneys are not palpable and there is no evidence of pelvic tumor

Neurologic Examination—There is no variation from the normal in the upper extremities She is unable to move the lower extremities they are spastic The patellar knee jerks are exaggerated ankle clonus is present and she has a bilateral Babinski During the course of the examination she constantly jerked the leg There is some slight movement of the toes of

both feet. Sensation in both legs is disturbed. She frequently calls hot, cold, and vice versa. Tactile sensation is altered and diminished. The superficial abdominal reflexes are not present.

The x-ray examination does not show any bone disease and the Wassermann reaction is negative.

The diagnosis in this case lay between hysterical paraplegia, paraplegia due to spinal cord tumor, and cerebrospinal syphilis. To differentiate among these probable causes the patient was examined by Professor Edward A. Strecker, who ruled out hysterical paraplegia and cerebrospinal syphilis. Dr. Strecker made a diagnosis of tumor of the thoracic spinal cord.

The patient was operated upon by me on August 6, 1921. The dura was exposed between the eighth and twelfth thoracic vertebrae. At the level of the tenth thoracic vertebra there was absence of pulsation of the cord and some bulging beneath the dura. The dura was incised and a subarachnoid collection of cerebrospinal fluid was found forming a distinct pseudocyst which compressed the spinal cord. The roof of the cyst was removed. Realizing how frequently pseudocysts of the arachnoid are associated with tumor formation, a careful search was made for the presence of a neoplasm. There was no evidence of a neoplasm in the substance of the cord, in front of the cord or at the sides.

The dura was closed by black silk interrupted sutures. The muscles and the skin were closed without drainage.

The patient reacted well from the anesthetic. Six days later she was able to move her toes and feet. She was able to differentiate between cold and heat and tactile sensation had returned.

One week later she was able to move the left leg. There was still some foot drop in the left foot. There was less power in the right leg than in the left. Two months after the operation the patient was able to be helped out of bed and to take several steps. She still had at this time a bilateral ankle clonus and a bilateral Babinski. Patient was discharged at this time. The improvement continued. She is able to be up and about the house.

Comment —This case is of interest because of the uncertainty of the diagnosis. She did not present the classical symptoms of cerebro spinal tumor. It is true she had the root pains. There was no sharp line of demarcation between normal and abnormal sensations. The root pains were not constant and there was no evidence of the Brown Sequard syndrome.

CLINIC OF DR. WALTER ESTELL LEE

CLINIC GIVEN AT THE PENNSYLVANIA HOSPITAL TO THE SURGICAL
SECTION OF THE GRADUATE SCHOOL OF MEDICINE OF THE UNI
VERSITY OF PENNSYLVANIA

THE SURGICAL TREATMENT OF BURNS

THE subject chosen for today is the surgical treatment of burns. I suspect that like the rest of the surgical profession you have little interest in this problem and may have been guilty of that routine hospital treatment of burns which has evolved from indifference and resulted in almost criminal neglect. Ravdin¹ calls attention to the percentage of deaths from burns which is still high far too high for modern surgery to accept. As a matter of fact it is higher than that of operations for acute appendicitis with peritonitis or gall bladder disease and yet these desperately sick patients are only too frequently treated by the intern and after a short time left to the tender mercies of the nurses. Their treatment really necessitates more expert care and sounder judgment than many cases of abdominal operations which the surgeon feels called upon to treat and confine his personal attention.

In 1918 we advanced the proposition that in burns we have involved the same surgical principles as in traumatic wound viz primary wound shock secondary or toxic wound shock infection and repair. To apply the same surgical principles to the treatment of burns as to all other traumatic wounds is therefore logical. The last five years have developed a very definite change in the attitude of older surgeons toward this surgical problem and contributions from both clinicians and research workers have appeared. Ravdin has summarized this experimental work in the following way:

Atlantic Medical Journal August 1917 683

¹ Therapeutic Gazette May 15 1918

1 The toxins which give rise to the toxemia in burns are developed by the application of heat to living tissues. An extract made from the skin of an animal burned after death and injected into a healthy living animal causes no symptoms while a similar injection made from the skin of an animal burned while alive produces a typical toxemia. These toxic symptoms do not occur if the burned area is excised or removed within eight hours after being burned while transplantation of the excised burned skin to healthy animals produces the constitutional toxic reaction.

2 That the toxin is carried by the blood stream is shown by the experimental ligation of the major vessels of the burned part preventing the development of the toxemia and re-establishment of the circulation causes death of the animal. The injection of blood removed from a toxic burned patient into healthy individuals results in a transitory toxemia.

3 The toxin is carried by the red corpuscles; it is in or absorbed by them and while the whole blood carries toxic principles the blood serum of these patients is not toxic except in large doses.

4 The toxins of the burned area are formed very rapidly for the removal of the burned area later than eight hours after the burn has occurred does not prevent the toxemia and the ligation of the major vessels draining the part must be performed within two hours to prevent the constitutional reaction resulting from toxic absorption.

From a pathologic standpoint the local and general changes produced by extremes of heat and cold are identical with those resulting from other forms of trauma. They are variations in degree only—never in kind. Thus we have:

1 Local reactions

2 General reactions

Local reaction

Burns

Inflammation

Erythema first degree in burns corresponding to

Congestion

Blistering or second degree in burns corresponding to

Exudation

Suppuration charring and phlegmon in
burns corresponding to

Suppuration

Third degree in burns corresponding to

Necrosis and death

Cicatrization in burns corresponding
to

Repair

General reaction

1 Primary wound shock

2 Toxic wound shock

3 Suppuration

4 Repair

Primary Wound shock—This is the phenomenon so convincingly demonstrated by Crile which follows severe shock or injury to the sensory nervous system. The factors involved are (1) Pain (2) shifting of body fluids and (3) abnormal radiation of body heat.

1 *Pain*—The exposure of large areas of the terminals of the sensory nerves of the skin and their irritation by the air or medicaments or dressings are responsible for unusual degrees of this form of shock in burns while the mortality from primary wound shock is probably greater in burns than in any other form of traumatic wound.

2 *Shifting of Body Fluids*—This phenomenon has been described by Barbour and Dale. The capillaries dilate especially in the area of inflammation and the dilated damaged capillaries are more permeable to fluids hence there occurs an outpouring of the blood serum into the perivascular tissue. Underhill¹ was the first to call attention to the rapid concentration of blood which followed extensive superficial burns evidenced by an increase in the percentage of hemoglobin occasionally reaching as high as 239 per cent. The significance of this was suggested to Underhill by his studies of soldiers exposed to lethal war gas and Cannon observed the same phenomenon in shock which followed extensive gunshot wounds. The factors of pain and shifting of body fluids are present in both of these apparently widely diverse types of wounds (burns gunshot and war gas

poisoning) and in each instance there is extreme inflammatory reaction and destruction of tissue. Whether this inflammatory reaction is the result of a gunshot wound, the poisoning of war gases, or extensive superficial burns, the response on the part of the body is always the same. The acute edema of the lungs in war gas poisoning and the rapid pouring out of fluid upon the surface of the body in burns, or if the skin be intact, the edema of the underlying tissues and the formation of blisters, are the result of congestion, exudation and the shifting of fluids of the blood through the vessel walls into the perivascular tissues. The resulting concentration of the blood, Underhill says, means an inefficient oxygen carrier, oxygen starvation of the tissues, fall of temperature, and finally suspension of vital activities. When the blood concentration reaches 125 per cent, the conditions for the maintaining of life are becoming precarious.

3 *Unusual Radiation of Body Heat*—The Research Committee of the American and British Armies found this to be almost a constant factor in the primary wound shock in war wounds. In addition to the capillary dilatation resulting from vasomotor paralysis consequent to the nervous shock in burns and the consequent dissipation of heat, we have the actual destruction of the skin and subcutaneous tissues, and hence the removal of the natural insulating covering for large areas of the body surface. The unusual loss of heat following severe burn is a definite factor in the production of primary wound shock.

The indications for the treatment of primary wound shock in burns are therefore very definite:

- 1 The relief of pain
- 2 The combating of the loss of fluids in the circulation
- 3 The prevention of the unusual dissipation of body heat

1 *Relief of Pain*—This requires the use of morphin in sufficient doses, but it also prohibits the use of any irritating medicament to the burned surface or the application of dressings which will subsequently have to be removed with the production of pain.

2 *Loss and Shifting of Body Fluids*—This requires the supplying of fluids in large quantities. It is true that the abnormal

thirst in a burned patient insures an abnormal supply of water but we have usually found that it is necessary to supplement this by rectal and even subcutaneous and intravenous administration. The blood concentration is the indicator for the quantity of fluid intake required—2000 to 3000 c c of fluid are usually demanded.

3 *Abnormal Radiation of Body Heat*—This can be counteracted by placing the patient beneath a tent which is built over the bed with blankets and a temperature of about 100° F maintained by means of electric lamps. In several of our recent cases we have found it necessary to combat the profound shock with intravenous glucose which is followed by the giving of insulin according to the suggestion of Pheaster. The results have been almost miraculous and one should not hesitate to resort to this means of mobilization of energy in the treatment of the primary traumatic wound shock of burns.

Secondary Toxic Wound shock of Burns—This in the past has presented an almost hopeless surgical problem. Efforts to treat the primary wound shock have been satisfactory for some time but the problem of secondary toxic wound shock has been unsolved. Lack of knowledge of the cause made this inevitable for many years now we know that it is the toxins of the burned tissues which are the factors to be combated we have a rational etiologic indication. It must be remembered that toxic absorption from the burned tissues is actually taking place during the period of primary traumatic shock and that the treatment of this toxemia should start in the stage of primary wound shock. That ligation of the vessels draining the parts must be performed within two hours after the injury to prevent constitutional reaction resulting from absorption of the toxins indicates the urgency of this primary treatment. Douglas several years ago suggested the application of adrenalin with novocain for the purpose of constricting the vasomotors and preventing a minimum absorption of the toxins produced by the burned tissues. Ravdin and others suggested the mechanical removal of the burned tissues with a scalpel. This is an ideal procedure and is logical in an

academic discussion of the analogy between traumatic wounds and burns. But its practical application is limited to very small areas. First the shocked patient is unable to stand radical debridement if the burned area is large and even if the debridement is possible infection is almost certain to follow unless postoperative technic is perfect. Finally the anatomical limitation of extensive mechanical removal of burned tissue is almost a constant factor. Davidson¹ first suggested the use of tannic acid to coagulate these burned tissues and to precipitate the protein alkaloids and glucosides in these tissues into inert substances. He found that when tannic acid was applied locally to human tissues it forms a more or less stable compound with the protein constituents of the body fluid and cells and when applied to burned surfaces in dilute solutions further penetration into the tissue protoplasm was prevented by this combination with the body fluids thus limiting the astringent effect to the more superficial layers of tissue. Any precipitated proteins on the surface provide a protective coating against further chemical bacterial and mechanical action as well as against sensory and inflammatory irritation. Since Davidson's first report we have routinely used tannic acid in the chemical debridement of the burned tissues in this type of wound and we have not only been able to confirm Davidson's theoretical premise but can say that our results have been uniform and are more satisfactory than with any method we have employed in the past to control the toxin of burned devitalized tissue. In the second degree burns and in the third degree burns in which the fat is not extensively destroyed it meets every indication. In the third degree burns where large areas of fat are involved there is a distinct disadvantage in that the tanned coagulated shell of dead tissue covers and imprisons the underlying dead fat and this prevents drainage and provides an ideal condition for infection supuration and absorption. We have overcome this disadvantage to some extent by making incisions in the form of a checker board crossing each other at right angles and penetrating through the burned tissue to normal tissue. Each square is about 2 inches

in diameter. These incisions are made at the time of the primary dressing and immediately after tannic acid has been first applied. As the membrane hardens instead of having a hard shell whose removal has to be started at the edges of the wound we have a shell broken up into small blocks like an alligator's skin and the edges curling at each one of these blocks provides drainage from the deep tissues. Thus this drainage is instituted almost from the beginning. This also makes it possible to remove sections of this coagulated leathery membrane at a very much earlier period than when it is in one large piece. We feel that the shell of tanned tissue requires removal before the tenth day when there is suppurating dead tissue beneath it.

Not only does tannic acid precipitate the toxic process of the dead tissue into inert substances but when used as a primary dressing it has other virtues which definitely meet the indications we have outlined.

- 1 It is surprisingly anesthetic. The patient is almost immediately relieved of the pain upon the application of tannic acid and we have not found it necessary in our experience to use novocain as was previously employed at the time of the primary treatment.

- 2 Because of the impervious character of the coagulated leathery shell the lymphatics are sealed and the usual transudation of body fluids from the wound is prevented.

- 3 This coagulated membrane acts as an insulator to the body surface and minimizes loss of body heat.

- 4 This dry membrane inhibits the growth of bacteria within its coagulated tissue cells.

Thus in using tannic acid as a primary dressing in burns we not only precipitate toxin and prevent the toxemia of the second stage of traumatic wound shock but we meet other considerations demanded in treating this type of traumatic wound. Davidson recommended the use of the solution of gauze dressings which are saturated with 2.5 per cent solution. We have found the modification suggested by Beck and Powers to be more practical viz. the spraying from metal atomizers of a 10 per cent solution of tannic acid on the entire burned surface care being taken to

have the surface constantly moist until it assumes a dark brown color. This should take place within twelve to twenty four hours. If it be second degree burn or third degree burn which does not involve the underlying fat the membrane may be allowed to remain in situ until epithelization has taken place beneath it when the shell will separate of itself. This will be from seven to fourteen days. If however the tanning process has not penetrated to the full depth of the devitalized tissue or if the fat is extensively involved necrosis or suppuration may occur beneath it. This is evidenced by fever and suppuration about the edges of the membrane. Every effort should then be made to remove the overlying tanned area and provide drainage to the tissue beneath it. After removal we will have a granulating surface which will require the same aseptic care as any other type of aseptic wound. In the dressing of these open granulating wounds we employ a daily application of a solution of dichloramin T—1/32 of 1 per cent—and over this wide mesh paraffin gauze and in the later stages dry gauze on top of the paraffin gauze. The wound is dressed each day floating off the paraffin mesh dressing with normal salt solution. The wound is dried by sunlight or ultraviolet light after each dressing and then the paraffin mesh gauze and germicide reapplied. In a very few instances we have found it necessary to graft the skin.

To Summarize—The same factors shock, necrotic tissue and infection are present in burns as in all traumatic wounds and therefore the same principles should be applied to their treatment as have been found of such practical value in the treatment of wounds produced by mechanical agents.

- 1 Treatment of shock and the relief of pain
- 2 Restoration of fluid balance in the circulation
- 3 Protection of body against undue radiation of heat
- 4 Prevention of absorption of the toxic products of dead and devitalized tissue

Secondary toxic wound shock demand the removal of dead tissue. Debridement of burns by excision although ideal theoretically is practically limited to small circumscribed areas.

it is dangerous in third degree burns and particularly in extensive third degree burns. But the spraying of a 10 per cent aqueous solution of tannic acid upon necrotic tissue precipitates the protein into an inert substance. This method of chemical debridement and the covering of the burned surface with a dry non absorptive and non toxic and sterile shell prevents subsequent infection of the wound, combats undue radiation of heat from the body surface, protects the exposed sensory nerve ends and provides a covering under which new epithelium reforms without constant traumatism of daily dressing by the usual methods.

Finally, this treatment has resulted in a definite decrease in immediate deaths from burns as a result of primary wound shock and the final results (expressed in the duration of healing and in the scar tissue) have been greatly improved. The amount of scar tissue formed in the healing of extensive burns and the consequent contracture are in direct proportion to

- 1 The amount of tissue destroyed by the original traumatizing agent

- 2 The type, degree and duration of infection

The primary loss of tissue no treatment can influence, but the duration of the healing process and the prevention of infection are entirely under the control of the surgeon.

CLINIC OF DRS JOHN SPEESE AND F A BOTHE

PRESBYTERIAN HOSPITAL

THE IMPORTANCE OF BLOOD CHEMISTRY ESTIMATIONS IN BURNS

THE treatment of burns by the use of tannic acid introduced by Davidson in 1925 has resulted in a marked improvement in the management of these distressing cases. The relief of pain is not only pronounced but the coagulation of the devitalized tissues and the precipitation of the protein and poisonous materials in the burned parts prevent their absorption and lessen the degree of toxemia. Davidson noted a reduction of the chlorids in the blood and the development of toxemia and suggested that the toxemia possibly produced certain alterations in the blood chemistry similar to those found in intestinal obstruction.

We have studied recently several cases in which toxemia developed in patients suffering from extensive burns and believe that the proper appreciation of the changes in the chemistry of the blood and its appropriate treatment may prove a decisive factor in the recovery of these cases.

Case I—The first patient was a man thirty nine years of age admitted to the hospital with second degree burns of the face neck the distal two thirds of both forearms both hands and both lower extremities from the groin to the toes. He was moderately shocked but promptly responded to routine measures. Tannic acid treatment was begun and a coagulum formed promptly so that the patient was comfortable in twenty four hours. Urine analysis on admission showed a cloud of albumin and red and white blood cells microscopically several succeeding urine examinations were essentially negative. On

the third day the patient developed toxic symptoms and became irrational within twenty four hours. At this time the urine contained a faint trace of albumin, red and white blood cells and an estimation of the blood chemistry showed Chloride 366, plasma CO_2 48 volumes per cent, the blood urea nitrogen 14 mg. Fluids were given freely by mouth and normal salt solution by hypodermoclysis but the toxemia was overwhelming and death occurred on the ninth day. On the day prior to death a second estimation of the blood chemistry showed the chlorides were still very low 380, the CO_2 was 38 volumes per cent and the blood urea nitrogen had risen to 56. Repeated examinations of the urine showed evidence of progressive kidney damage. Abdominal distention developed twenty four hours before death, the patient vomited 10 ounces of blood shortly before he expired. These events led us to suspect a Curling's ulcer. At postmortem examination no ulcer was found in either the stomach or duodenum but there were some areas of hemorrhagic gastritis in the cardiac end of the stomach. In addition there was a large right kidney and a very small one on the left side which had undergone complete destruction and atrophy. In the bladder the left ureteral orifice was completely obliterated and likewise there was obliteration of the lumen of the left ureter throughout its entire length. Dr. Eiman, the pathologist, believed the destruction of the left kidney and ureter was due to an old inflammatory lesion which was followed by atrophy of the kidney tissue.

Case II—The second patient, a man forty years of age, was admitted to the hospital with second degree burns of the face and neck and second and third degree burns of both upper extremities from a few inches above the elbows to the fingers. Applications of 2½ per cent aqueous solution of tannic acid were made to the burns of the arms and 55 per cent tannic acid ointment to the burns of the face. A firm coagulum formed over the burned areas. On admission the temperature was normal, within twenty four hours it rose to 103° F. and the patient began to feel drowsy. Urinalysis negative on admission.

sion later showed a trace of albumin a few hyaline light and dark granular casts. Estimation of the blood chemistry showed CO_2 of 75 volumes per cent blood chlorids 384 and blood urea nitrogen 18 mg. In view of the fact that a pronounced fall in blood-chlorids was present in this case the patient was given intravenously 500 cc of 5 per cent glucose in normal salt solution (0.9 per cent) and fluids by mouth were given freely a total of 113 ounces in twenty four hours being taken. There was a marked reaction following the intravenous administration of glucose this was accompanied by a chill the temperature rising to 104.4°F . After recovery from the reaction the patient stated that he felt better and mentally was much improved. Five per cent glucose in normal salt solution was administered daily for three days and daily estimations of the blood chemistry were made over this period the results are shown in the accompanying table. On the eighth day the temperature fell to normal for the first time the patient was mentally clear the urinary output increased and was normal and he expressed a desire for food. The blood chemistry at this time was normal and the burns were becoming epithelized rapidly. Urine analysis was negative at this time.

ADMITTED TO HOSPITAL FEBRUARY 26 1928

Date	Blood urea	CO_2 blood	Chlorids	Blood-sugar
2/29	18	75	384	113
3/1	19	62	440	118
3/2	16	64	334	
3/3	13	57	432	

The outstanding points to be discussed in these cases are first the alterations in the blood chemistry similar to those found in the toxemia of intestinal obstruction and second the benefit derived in the second case by the administration of glucose and saline intravenously. The elevation of the plasma CO_2 in the second case is similar to that found in alkalosis occurring in the toxemia of intestinal obstruction. We have been interested in the toxemias occurring in surgical conditions particularly those seen in intestinal obstruction. The first studies

were confined for the most part to cases of gastric or duodenal ulcer or high intestinal obstruction. However by studying the blood chemistry in all cases of persistent vomiting as they occurred on our service we found similar changes in the blood in patients who had been operated upon not only for duodenal and gastric ulcer or high intestinal obstruction but also for acute and chronic appendicitis cholecystitis retroperitoneal fibroma perforation of a diverticulum of the sigmoid and inguinal hernia. These findings suggest that patients developing persistent vomiting are apparently suffering from the same type of toxemia as is shown by similar alterations in the blood chemistry.

Although the degree of toxemia varied in the 7 cases discussed there is no doubt that the intravenous administration of glucose and saline was of value in combating the toxemia in the second case as the patient appeared less toxic following this form of therapy and the urine in which casts and red blood cells were beginning to appear promptly became normal.

THE USE OF TANNIC ACID IN CONDITIONS OTHER THAN BURNS

THE many advantages and excellent results obtained by the application of tannic acid in the treatment of burns is universally admitted. The lessening of pain following the formation of the coagulum suggested the use of tannic acid in a case of fistula of the small intestine with marked excoriation of the skin resulting from the irritating discharge. The patient suffered great pain which was not relieved by the various measures applied to protect the skin. After cleansing the excoriated area tannic acid in 2¹ per cent solution was applied and the skin was exposed to the air. The fecal discharge was reduced in amount by permitting little food for two days when crust formation began and this when firm proved an efficient protection with almost instant relief from pain which previously had been most distressing. At the time the fistula was closed by operation and the crusts removed to cleanse the skin it was noted that rapid epithelization had taken place exactly as in the more superficial lesions produced by burns.

With this happy result in mind we have used tannic acid with the same encouraging results in a case of dermatitis of the neck due to irritating discharge from a bronchial fistula and in the dermatitis which occasionally follows the use of dichloramin T. The skin blebs occurring after fracture of the lower extremity often prevent the use of extension or delay in the application of a cast. Tannic acid in these cases has been particularly advantageous in drying the blebs after the fluid has been expressed and frequently has saved considerable time by permitting the earlier use of plaster casts.

The application of tannic acid in the conditions noted has proved so satisfactory that we wish to record the results although we have no doubt that others accustomed to its advantage in burns have used it in similar lesions.

TUMORS OF THE CECUM SIMULATING ACUTE APPENDICITIS

BENIGN and malignant tumors of the cecum in the early stages not infrequently produce symptoms and give rise to physical signs which so closely simulate those of appendicitis that the differential diagnosis becomes most difficult. While the similarity is most commonly encountered in inflammatory and tuberculous lesions it occurs also in ulcerative carcinoma with secondary infection. Obstructive symptoms are not so common in tumors of the cecum as they are in growths situated elsewhere in the large intestine. If a mass can be palpated it is a most valuable aid in differentiating these conditions but unfortunately tumors in this locality are not palpable in many instances. It is a common occurrence to find at the time of operation in advanced cases that the growth has become adherent to the surrounding structures but was not palpable before operation. Erdman and Carter have alluded to the difficulty in diagnosis and have reported a series of 18 cases of tumor of the cecum. 5 of these had had previous operations for recurring appendicitis. Errors in diagnosis occur particularly in early lesions as in advanced cases the pronounced anemia and cachexia so characteristic of malignancy in the right half of the colon make the differential diagnosis more apparent.

We have treated recently 2 cases of tumor of the cecum in which the symptoms, history and physical examination so closely simulated those of acute appendicitis that immediate operation was done and no attempt was made to carry out the studies which might have made the preoperative diagnosis more accurate. The rigidity of the abdominal wall in both cases precluded any possibility of palpation of a tumor.

Case I—The patient a man thirty eight years of age was admitted to the hospital with the chief complaint of pain in the abdomen. Twenty four hours before admission the pa-

tient was seized with a sudden sharp stabbing pain in the right lower quadrant of the abdomen nausea and vomiting followed The sharp pain did not continue but was followed by a dull ache which however has recently become more severe There was tenderness over the right lower quadrant and flexion of the right thigh to relieve the pain and soreness The patient has not been able to take any food since the pain started as the sight of food caused nausea there has been no subsequent vomiting

During the past five months the patient had several attacks of pain in the vicinity of the umbilicus but never had an attack similar to the present one In the former attacks the pain was growing in character began about five minutes after taking food and would last about one hour and was unrelieved by taking alkalis etc Four months ago he had an attack which lasted four days during this time he vomited all food taken He has not lost any weight or strength between attacks of pain has had a normal appetite no diarrhea but a tendency to constipation

Physical Examination —The patient was a well nourished adult male apparently suffering from pain The positive findings were confined to the abdomen There was no distention on palpation there was definite rigidity over the right lower quadrant and marked tenderness over McBurney's point Rectal examination showed marked tenderness on the right side but no mass could be palpated Temperature 99.8 F pulse 104 hemoglobin 78 red blood cells 3 980 000 and white blood cells 10 950 Urine analysis showed a faint trace of albumin with 4 to 6 white blood cells and 2 to 4 red blood cells to the high power field A diagnosis of acute appendicitis was made and operation performed

Upon opening the abdomen about 200 c.c. of clear straw colored fluid was aspirated A mass was found in the ileocecal region with moderate inflammatory reaction in the surrounding tissues the appendix was acutely inflamed throughout its length The tumor was situated in the cecum and had a definite crater formation on its mucous surface There were enlarged nodes in

the mesentery of the cecum and several carcinomatous nodules were situated at the base of the appendix the proximal third of which was very acutely inflamed but no perforation could be found. The carcinomatous nodules situated at the base of the appendix the terminal ileum cecum and appendix and the ascending colon were resected although a two stage operation

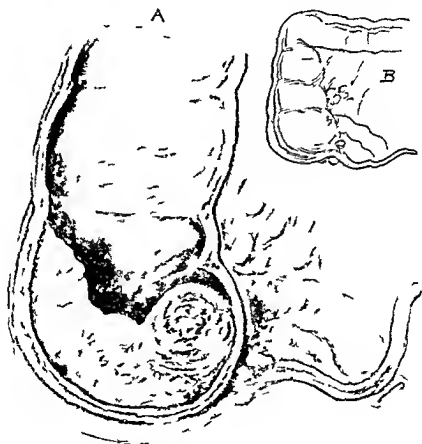


Fig. 90—Ulcer and carcinoma of cecum

in the presence of so marked a degree of inflammation a safer procedure is a rule. A lateral anastomosis was made between the ileum and the transverse colon and all enlarged glands in the mesentery were removed with the resected bowel en masse (Fig. 290). The pathologic examination showed ulcerative carcinoma of the cecum with extensive secondary infection, but

no evidence of metastasis to the lymph nodes the appendix was acutely inflamed. It is now fourteen days since the operation and the patient is making an uneventful recovery.

Case II—The patient a man twenty one years of age was admitted to the hospital complaining of pain in the lower abdomen. The present illness began forty eight hours before admission with generalized abdominal pain more severe in the epigastrium. After twenty four hours the pain became localized to the lower right quadrant and nausea developed. He was constipated and took Pluto Water and castor oil for relief. These active measures caused purgation but did not relieve the pain and nausea. On admission the pain was of the same severity as at onset and was localized to the right lower quadrant.

The patient states that he had not experienced an attack similar to the present one but during the past year had three attacks which he thought were due to ptomaine poisoning. These attacks were characterized by mild abdominal cramps confined to the lower abdomen accompanied by loss of appetite diarrhea but no nausea or vomiting. All three attacks lasted about four days and all followed dietary indiscretions. Upon physical examination there was tenderness and rigidity in the lower right quadrant of the abdomen no masses were palpable. Temperature was normal and pulse was 90. A diagnosis of subacute appendicitis was made and operation performed.

A right rectus incision was made and exploration revealed a large mass in the ileocecal region. The cecum and appendix were delivered with the mass which was apparently outside the bowel but between the two layers of the mesentery at the ileocecal junction (Fig 291). There was moderate inflammatory reaction in the appendix and surrounding tissues several enlarged lymph nodes were palpable in the mesentery and the mass had extended into the ileocecal valve in such a manner that it simulated an intussusception. As it was impossible to determine whether the tumor was of a tuberculous inflammatory or neoplastic nature from inspection a resection was performed and a lateral anastomosis was made between the ileum and the cecum.

at the hepatic flexure. Pathologic examination showed acute subacute and hemorrhagic inflammation but no evidence of tuberculosis or malignancy could be found.

Although the pathologic study did not show any evidence of tuberculosis or malignancy, resection was justified as the mass



Fig 291 —Inflammatory mass at ileocecal junction

was impinging upon the lumen of the cecum and undoubtedly would have caused trouble later if not removed and because many inflammatory growths reveal areas of tuberculosis or cancer on microscopic examination.

MODIFIED RAMMSTEDT OPERATION FOR HYPERTROPHY OF THE PYLORIC RING

PYLOROSPASM secondary to various inflammatory diseases in the abdomen is of common occurrence and is attributed generally to reflex irritation from the primary disease especially in the case of chronic inflammatory conditions of the gall bladder and appendix. Not infrequently the symptoms of pylorospasm are more distressing than those of the primary disease and for this reason the diagnosis is often difficult. It is in this type of case that operations are undertaken frequently with the diagnosis of ulcer of the stomach or duodenum and the exploration reveals only a thickening of the pyloric ring which is usually secondary to chronic disease elsewhere. While many patients are cured by appendectomy cholecystectomy etc. in others the effect of the primary disease persists as pylorospasm. In these cases we have noted that those who have had careful postoperative care permanent cure results more promptly than when such treatment is indifferently carried out. This is particularly so if alterations in gastric secretions are not corrected the patients are not relieved of their symptoms and the operation is regarded as a failure in so far as ultimate cure is concerned.

For some time we have been examining the pyloric ring in all patients who have had some degree of pylorospasm and have found varying degrees of hypertrophy of the muscle. While no decided conclusions can be drawn from the notes in these cases it has been our opinion that those with considerable thickening of the pyloric ring have been the ones in which the symptoms of pylorospasm have persisted for longer periods in the postoperative course.

In view of these observations and the benefit derived from the Rammstedt operation in pyloric stenosis in children we have felt that surgical measures should be considered when a marked hypertrophy of the pyloric ring was found. In a recent paper Judd advocated the removal of a portion of the pyloric muscle

in excision of duodenal ulcers and this principle we have endeavored to apply to certain cases of pronounced thickening of the pylorus in an attempt to secure better results in these patients. The procedure we have used consists in an incision made in the longitudinal axis of the pylorus exposing the muscle about $\frac{1}{2}$ inch of the latter is excised. The peritoneum is not sutured over the area but the gap is allowed to remain open. A piece of omentum is then excised and sutured over the line of incision. We have tried this procedure in 4 cases in which marked hypertrophy of the pyloric ring was present. Two were associated with chronic lesions of the appendix one with chronic cholecystitis with stones and one occurred in a patient who had adhesions following the removal of a chronically diseased appendix six years ago. All 4 patients had symptom characteristic of *pylorospasm independent of the symptoms of their original pathologic lesion*.

The operation was performed only when a marked hypertrophy was found in patients on whom careful after treatment would be difficult to carry out. We believe the operation is not indicated if visceroptosis is present and have not used it in such cases.

The following abstract is made from a typical case of this group.

The patient a woman thirty seven years of age was admitted to the hospital with the chief complaint of pain over the right side of the abdomen. The attacks have persisted for four years and were not typical of any particular abdominal condition. The pain was intermittent sometimes it was sharp and severe lasting a few moments at other times it was a dull gnawing pain and would last for weeks and most frequently was localized in the right lower quadrant. At times the pain was associated with nausea vomiting and the belching of gas but no relief was experienced after the acts. The physical examination of the patient a tall woman of the ptotic type revealed a slight degree of tenderness over *McBurney's point* this was the only noteworthy finding. Examination of the blood showed hemoglobin of 55 per cent red blood cells 5980000 and white

blood cells 10 600 A fractional gastric analysis indicated complete absence of free HCl in 8 out of 10 specimens withdrawn in 2 specimens free HCl was 6 the total acidity was low the highest estimation being 36 Upon exploration a kink was found in the appendix it was chronically inflamed had a few adhesions around it and was removed Exploration of the upper abdomen showed no pathologic changes in the biliary tract and no evidence of ulcer was found in the stomach or duodenum but there was a pronounced hypertrophy of the pyloric ring A modification of the Rammstedt operation as outlined above was performed The patient made an uneventful recovery and up to the present time seven months after operation has been symptom free

The relief in the other cases operated upon has been equally prompt and x ray studies several weeks after operation showed a normal pylorus and no sign of spasm While definite conclusions cannot be drawn from the results secured in 4 cases we feel that this relatively simple procedure has a field of usefulness and may be of value in other cases of this type

CLINIC OF DR. FRANCIS C. GRANT

FROM THE CLINIC OF DR. CHARLES H. FRAZIER, UNIVERSITY HOSPITAL AND FROM THE NEUROSURGICAL CLINIC OF THE POST GRADUATE HOSPITALS OF THE UNIVERSITY OF PENNSYLVANIA

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VENTRICULOGRAPHY¹

THERE is no single factor which is of greater importance in successful extirpation of a brain tumor than precise localization of its position. But in spite of recent advances in the technic of neurologic examination in spite of the application to this problem of ophthalmologic, roentgenologic and neurotologic methods of diagnosis there still remains a group of cases unquestionably harboring a brain tumor the position of which we are unable to determine with any degree of accuracy. It is by the use of ventriculography that many of these baffling problems in localization have been cleared up and the tumor discovered and removed.

A striking finding in the examination at necropsy of a brain which is the seat of a new growth is the effect of the tumor upon the ventricular system. Any intracranial neoplasm which is of sufficient size and so situated as to produce an increase in intracranial tension will cause variations in the position, size and shape of the ventricular system. It occurred to Dandy that if it were possible to outline the ventricles by replacing the cerebrospinal fluid with a substance which would throw a shadow on a Roentgen ray film that could be differentiated from that cast by the cranial bones these abnormalities in the size, shape and position of the ventricles produced by a tumor could

¹ Abstracted from the thesis of the author, "The Use of Ventriculography in the Postgraduate School of Medicine of the University of Pennsylvania and based on communications published in the *American Journal of Roentgenology and Radium Therapy*, vol. 11, No. 3, September 1917, 764 and *Radiology*, November 1917.

thus be visualized and based on these changes in ventricular outline the position of the growth accurately determined. He found that air would produce the necessary contrasting shadow on the film and had little toxic effect in the subarachnoid space. Ventriculography consists then in the removal of the fluid from the lateral ventricles by direct tap and its replacement by air. Roentgen ray films of the head are made. From a study of the

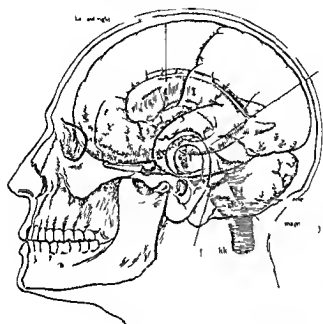


Fig. 292—D. G. M. H. W. G. P. T. f. t. l. y. t. t. p. pe
l. t. h. p. t. m. p. o. t. a. t. t. d. t. 11. d. m. k. (Mod. f. d. f. m.
B. d. l.)

distortions in ventricular outline the position of the tumor causing these defects may be disclosed.

The normal topography of the ventricular system and its relationship to external landmarks may best be appreciated by reference to Fig. 292. It must never be forgotten that the cerebrospinal fluid is formed in the two choroid plexuses one of which is situated on the floor of each lateral ventricle. This fluid is absorbed from the subarachnoid space over the cerebral

cortex In its passage from the ventricles to the cortex the fluid leaves the lateral ventricles through the foramina of Monro to reach the third ventricle flows down the aqueduct of Sylvius into the fourth ventricle and finally out through the foramina of Luschka and of Magendie into the subarachnoid spaces This cerebrospinal fluid pathway is narrow and easily obstructed Interference with its free circulation causes a dilatation of the ventricular system above the point of blockage Only from a proper conception of its results can a localization of the position of an obstruction be made

This introduction of air into the ventricles is a relatively simple procedure Two small trephine openings are made 7 cm above the occipital protuberance and 2 cm lateral to the mid line From this point the needle is introduced horizontally in the plane of the tip of the ipsilateral ear and slightly laterally Normally the ventricle should be entered at a depth of from 4 to 5 cm from the surface The posterior approach has three advantages The cannula passes through a relatively silent cortical area above the visual tract and behind the sensorimotor centers the vestibule of the lateral ventricle is entered where the anterior posterior and inferior horns unite which is its widest point and consequently least likely to be collapsed by pressure most important of all through this approach nearly all the fluid in the ventricle can be drained by tilting the head backward It is essential to remove all the fluid possible for unless this be done one cannot be sure that a defect in ventricular outline is due to an actual lesion and not to fluid trapped in one or another horn Rotation of the head from side to side will in part prevent this and insure more complete drainage But by far the larger number of our mistakes and failures accurately to localize the lesion have been due to incomplete filling of the ventricular system with air

Bilateral tap should always be attempted primarily because thereby both ventricles can be entirely emptied of fluid But there are further advantages in tapping both sides By this procedure dye (indigo carmine) can be injected into one ventricle and if recovered from the other it is presumptive evidence that

the foramina of Monro are patulous and not blocked by a tumor. With a cannula in either lateral ventricle the amount of fluid contained in each may be measured and an estimate made of their comparative size. If a marked difference in the quantity of fluid obtainable from one lateral ventricle as compared to the other can be shown this is very strong evidence that one of them has been compressed or in part obliterated and that the tumor lies in that cerebral hemisphere harboring the smaller ventricle. Lastly, by bilateral tap complete drainage and measurement of the amount of fluid withdrawn, a slightly smaller amount of air may be injected into one cannula with perfect safety because with free intraventricular communication the other cannula acts as a release for the air and the intracranial pressure is never raised. In fact we have found that if the ventricles are fairly large say a total of about 60 c.c. of fluid can be removed from both; it is not necessary to inject air. All the fluid is drained out by rotation and backward tilting of the head and mild pressure over both jugulars to increase intracranial tension somewhat and force out the residue. Once all the fluid is withdrawn the air is sucked in to replace it by the negative pressure within the ventricles and entirely satisfactory plates may thus be made without actually injecting any air at all. In any event it is essential not to introduce air in a larger amount than that of the fluid removed. All manipulation must be accurately controlled by manometric pressure readings and great care taken that the intracranial tension be not raised above the level found when the first cannula was inserted.

We have been criticized for using bilateral taps. The disadvantages are these. Two incisions and trephine openings are required and the brain is punctured twice. If an occipital tumor is present the cannula might pass through and cause a hemorrhage into it. Fortunately occipital pole tumors are usually easily diagnosed by visual field defects. It is only in blind or uncooperative patients that such an accident is likely to occur. Furthermore in penetrating a tumor in this region a change in tissue resistance to the passage of the needle could almost certainly be detected by the experienced operator and its presence

thereby determined. The ventricular distortion produced by an occipital or parieto occipital tumor would be so marked that localization from a study of the films should be certain. If immediate operation were performed any reaction resulting from a hemorrhage into the neoplasm could be prevented. Since most unlocalizable tumors lie in the frontal lobes or midline out of the way of a cannula introduced into the occipital region and since the advantages of bilateral tap (already outlined) are so



Fig. 293.—Normal ventricles, anteroposterior view. Note symmetric undistorted lateral ventricles lying exactly in the midline with third ventricle below the line exactly in the midline.

apparent we believe it to be entirely justifiable and shall continue in its use.

After the air has been introduced into the ventricles Roentgen ray films are taken in the anteroposterior, posteroanterior and lateral positions. The right and left lateral films should be stereoscopic. Through the ingenuity of Dr. Eugene Pendergrass of Dr. Henry K. Pincoast's staff it has been made possible to take the films with the tube below and the Bucky diaphragm above the head. This is an important advance in the technique.

tion in the outline of that lateral ventricle with a relatively normal ventricle on the opposite side. The position of the tumor within the hemisphere may be determined by abnormalities in the position of that lateral ventricle or a filling defect in its outline (Figs 295-299). These effects are due to direct impingement by the tumor on the lateral ventricles and not primarily to interference with cerebrospinal fluid circulation.



FIG. 296.—Patient with tumor of the third ventricle. The lateral ventricles are both enlarged.

Equal and symmetric enlargement of the lateral ventricles is never caused by a tumor lying within the cerebral hemispheres. The lesion must lie in or impinge upon the third ventricle supratentorially or obstruct the aqueduct or fourth ventricle below the tentorium to produce this result. A subtentorial tumor in any position, whether in the cerebellar lobes or vermis, can cause obstruction. The uniform distention of the lateral ventricle is

due to the internal hydrocephalus resulting from the interference with the free circulation of the cerebrospinal fluid through the midline ventricles. Since this internal hydrocephalus can result from a lesion above or below the tentorium, the differential diagnosis between a block in these two locations is important. This distinction is of particular interest to the neurosurgeon because the operative approach to the two regions is so radically differ-



Fig. 29 —Distention of left lateral ventricle with irregularity of outline due to encroachment of tumor lying in right cerebral hemisphere.

ent. Posterior fossa tumors cause distention of the entire ventricular system above and usually including the fourth ventricle. The third ventricle is distended proportionally to the lateral and therefore may be easily visualized. But if both lateral ventricles be equally and symmetrically distended and if the third ventricle cannot be seen, it has been obliterated by a tumor in this region lying above the tentorium (Figs. 300-303).

As a rule the anteroposterior and postero anterior films furnish the most decisive information as to changes in ventricular outline. Normally all four ventricles may be readily discerned on the films taken in these planes and under pathologic conditions abnormalities are here most readily apparent. If a ventricular area can be shown to be normal in any one position defects in this region evident in other views are probably due to error in



Fig 298—Late film of a patient with a large tumor of the brain. The ventricles are displaced and compressed by the mass.

technic. Defects in outline must be constant in all views to be of any value. Localization by ventriculography should be carefully checked against known clinical findings. If the evidence derived from this procedure points to a tumor in an active area of the brain and if clinically there are no positive symptoms indicating a lesion in this region the ventriculographic finding must be very positive to warrant exploration on this ground alone.

The principal indication for ventriculography is the presence of increased intracranial pressure underlying cause for which can not be accurately localized. But every other means at our disposal should be exhausted before air injection is practised. Once a ventriculogram has been made if an accurate localization is possible no time should be lost in attacking the tumor. It is



Fig. 299.—Int. ventricular tumor (T) impinging on outline of ventricle. Note marked degree of internal hydrocephalus which may accompany an intraventricular tumor.

useless to deny that ventriculography is a dangerous procedure. Particularly in the presence of a high intracranial tension it involves a very definite risk. Alarming reactions are not uncommon. But by operating whenever possible within twelve hours or less after the injection of air distressing symptoms are avoided. The mortality in those instances in which a craniotomy



Fig 300—Lateral view of skull



Fig 301—Lateral view of skull, showing the base of the skull and the profile of the cranium. The image is high-contrast, with dark areas representing the bone and lighter areas representing the interior of the skull.

has immediately followed a ventriculogram has been at least as low as in the cases in which no ventriculogram was required. If for any reason the position of the tumor cannot be determined with sufficient certainty to warrant exploration it is our custom to tip the ventricles again and release the air. This we believe lessens the risk of the development of a severe intracranial crisis.

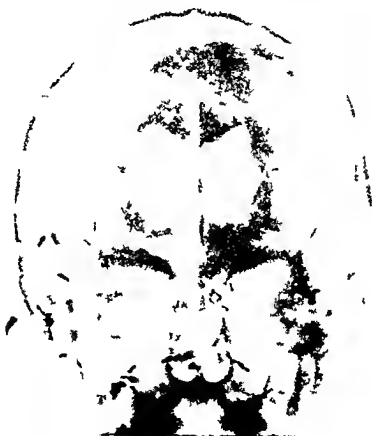
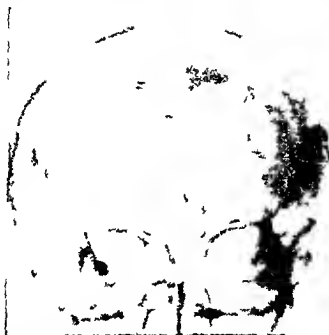


Fig. 307.—Tumor of the posterior fossa. Note symmetric dilatation of ventricle including the third ventricle.

Summary—Ventriculography in experienced hands is not a hazardous procedure. By its use it is possible to determine accurately the position of otherwise unlocalizable intracranial tumors. But this method should only be used when all others have failed. Technically, in our opinion, the most important single factor in avoiding errors in interpretation of the roent

genograms is the complete removal of the fluid by bilateral ventricular tap. In reaching a conclusion only obvious defects which are apparent on all the films should be considered. In spite of its dangers in spite of the possible errors in technic which may render abortive attempts at localization ventriculography may afford more positive information about the situation



P 403—Tum. of the lateral ventricle with complete block of the lateral ventricle. Comp. of the lateral ventricle with complete block of the lateral ventricle. Differentiation between subdural and supratentorial tumors.

of the lesion than any other procedure. It is our firm conviction that no patient should be given a hopeless prognosis and sent away to die as comfortably as may be because we are unwilling to risk a mortality through the use of air injection. Until we have attempted ventriculography we have no right to tell the patient that he has an unlocalizable intracranial neoplasm and is beyond our help.

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SPLENECTOMY REPORT OF FIVE CASES

SURGERY of the spleen has attracted considerable attention in the past twenty five years. Removal of extensively ruptured spleens is obligatory in order to attempt to save life even though the operation is attended by a high mortality. Splenectomy in some forms of splenomegaly associated with blood dyscrasias apparently results in return to normal. In some it prolongs life and in others it makes the individuals more comfortable.

With improved technic for blood examinations the more careful study of blood dyscrasias—with or without splenomegaly—the comparative results following splenectomy from various clinics we soon will be able definitely to decide whether a spleen should or should not be removed.

The operation is spectacular if large and not adherent but may be most harassing if densely adherent to the diaphragm. Dextrous operators have been forced to abandon the operation because of adhesions.

Indications for Splenectomy —Injury —Extensive rupture of the spleen generally necessitates removal. A stab wound or bullet wound may cause profuse bleeding but if at time of operation bleeding has ceased and the vessels are not injured one is justified to employ conservative surgery. Suture of the spleen may be attempted by introducing mattress sutures tying them over 8 or 10 strands of catgut or sections of muscle obtained from the abdominal wall. Wounds may be packed with gauze to control hemorrhage.

*Hemolytic Jaundice —*The enlarged spleen in this form of anemia apparently is the cause of the destruction of the erythro-

cytes. The spleen is moderately enlarged, the skin and sclera are icteric, there is absence of bile in the urine and the stools are unaltered. The constant feature is the increased fragility of the red blood cell. There are two types, acquired and congenital. The results of splenectomy are almost dramatic. The jaundice often disappearing within twenty-four hours unless there be an associated obstructive jaundice due to gall stone. Calculi have been found in over 50 per cent of the cases of hemolytic jaundice reported by Moynihan and the Mayo Clinic, an important fact to bear in mind when operating for this type of splenomegaly. The gall bladder and ducts should be examined in every case. Fragility of the red cells occasionally persists after operation in symptomatically well patients. Temporary relapses may occur but these need not be discouraging. The mortality rate is low.

Purpura Hemorrhagica (Essential Thrombopenic Purpura)—Splenectomy has accomplished striking results. There often is prompt subsidence of hemorrhage after the operation. Generally there is rapid increase of the platelets. Recurrence of symptom has been noted weeks or months later.

Splenic Anemia—In the early cases operation is of undoubted value. Even in the third stage cases have shown distinct improvement.

Myeloid Leukemia—Treatment of the spleen with radium reduces its size and the number of leukocytes and makes splenectomy quite safe. Formerly nearly all deaths from operation were due to hemorrhage from the splenic vessel, the raw surface on the diaphragm from separating the adhesions or from the abdominal wall.

Gaucher's Disease—This infrequent form of splenomegaly was described by Gaucher in 1897. The largest spleens encountered by pathologists are found in this condition. It cannot be proved that the disease is arrested by splenectomy, but the patient is made more comfortable. Apart from the mortality, about 20 per cent, the operation does no harm.

Splenic Tumors—Cysts and tumors of the spleen are rare. Splenectomy is indicated before operation.

Abscess of the spleen is best treated by drainage Carson recommends splenectomy

There are many other conditions in which splenectomy has been done some quite properly so We cannot discuss all of the likely indications

General Suggestions—Inasmuch as the spleen contains a large amount of blood a suitable donor should be in readiness for transfusion immediately after the operation Much blood may be lost incident to the separation of adhesions or injury to the large vessels in the pedicle

A left Bevan incision will suffice for the average case The organ must be thoroughly free before an attempt is made to deliver it on the abdominal wall In cases of long standing splenic anemia the adhesions to the diaphragm may be very dense making separation most difficult Bleeding may be profuse which can be temporarily controlled by placing a large gauze pack against the diaphragm in the splenic fossa after the spleen has been separated and turned toward the right One now may work deliberately Before applying the clamp to the pedicle we should recall several facts

The gastrosplenic omentum which is a fairly delicate fold of peritoneum enveloping the inferior gastroepiploea and the vasa brevia extending from the hilum of the spleen to the fundus of the stomach The lienorenal ligament extending from the spleen to the kidney which is made taut as the spleen is drawn forward The close proximity of the tail of the pancreas thus running the risk of injuring it by careless application of the clamp

It is well to double ligate the pedicle with heavy catgut thereby obviating the danger of one ligature slipping or the cutting of friable vessels by a thin ligature The field is inspected for an accessory spleen Removal is necessary in order to obtain good results in certain blood dyscrasias The pad is removed if there continue to be bleeding points on the diaphragm they can be secured by suture ligatures A small pad may be used to stop a general ooze

We are presenting 5 cases all of which have features that make them interesting

- I Gaucher's disease
- II Splenic anemia
- III Purpura hemorrhagica
- IV Myeloid leukemia
- V Myeloid leukemia

Case I Gaucher's Disease—The patient is a Hebrew age twenty five. Was referred to Dr. E. J. G. Bearlsley at the Jefferson Hospital September 12, 1927 with the following symptoms: Nausea, sensation of heaviness in the epigastrium and left hypochondrium, attacks of sharp shooting pain in the left hypochondriac and iliac regions, loss of weight. Parents are well, one sister died at three from asthma. One sister living age twenty nine has diabetes. Following the diagnosis of our patient I examined the sister and could find no evidence of Gaucher's disease.

He had frequent nosebleeds as a child, two a week, none after ten. Father gave similar history. He had measles, mumps, chicken pox, and whooping cough in childhood, tonsillectomy at twelve, pneumonia at twenty. Uses alcohol sparingly and tobacco in moderation. Was told by a physician ten years ago that his liver had dropped. Denies venereal infection.

In July, 1927, he began to have a feeling of heaviness in epigastrium and left abdomen. This sensation is constant. There has been morning nausea for the past month which disappeared as the day progressed and by evening he was able to eat a good meal. There has been no vomiting. Has lost 10 pounds in past month, present weight 155 pounds. Frequent frontal headaches in the past year. No hematuria or melena.

Physical Examination—The man is of average size. The face and hands show brownish yellow discoloration. No attention was paid to this as he had just returned from the sea shore. No jaundice. No enlargement of superficial lymphatic glands. There is a yellowish wedge-shaped thickening of the conjunctivæ on both sides of the corneæ with the apex toward the canthus. This was observed with indirect illumination after we had re-

ceived the pathologic report on the spleen. Chest negative except for increased liver and spleen dulness.

The abdomen is rounded and asymmetric with fulness in the epigastrium and left hypochondrium. The liver extends 3 inches below the costal border. The spleen extends to the midline and almost to the crest of the ilium. We thought that we could demonstrate fluid in the peritoneal cavity. Splenic dulness extended to the left sixth rib midaxillary line.

Blood examinations

D	Hemo- globin percentage	Red blood cells	White blood cells	Plt's	Small eos	Large eos	Eos
9/13/2	45	3 230 000	5 600	54	24	4	14
9/16/2	54	3 520 000	1 800	60	20	4	6
11/21/2	50	3 120 000	5 200	57	38	4	2
11/24/2	59	3 500 000	9 200	60	30	4	2
11/25/27			13 000				
11/28/2			10 200				
11/29/2	7	3 160 000	13 700	52	38	3	2

The second count was done after x-ray treatment to the splenic area.

Blood platelets 200 000. Bleeding time three minutes. No malarial parasites. Coagulation time four minutes thirty seconds. Blood Wassermann +1.

December 7 1927. Non protein nitrogen 23.06 mg. urea 12-98. creatinin 1.44 mg. cholesterol 96.1 mg.

December 10 1927. White blood cells 26 400.

Three stool examinations give a positive benzidin reaction for blood. No ova or parasites.

Frequent examinations of the urine showed from a trace to a light cloud of albumin. 10 to 15 pus-cells. finely granular and hyaline casts. The Mosenthal test was satisfactory.

x-Ray of the teeth and accessory sinuses revealed no evidence of infection. It showed no lung pathology.

The patient left the hospital September 27th. The case was diagnosed Banti's disease and he was readmitted November 21st.

Operation Splenectomy—November 23 1928. Ethylene anesthesia. Left rectus incision. No fluid in the peritoneal cavity. The liver was enlarged. highly darker than normal but

showed no scarring The gall bladder appeared normal The spleen showed nothing unusual grossly except for its enormous size The few slight adhesions to the diaphragm were easily separated It was delivered and turned toward the right An accessory spleen the size of a small lemon was intimately connected with the pancreas which was removed after the splenic pedicle had been ligated No bleeding of any moment As we closed the abdomen an assistant transfused him by the Unger method with 350 c c of blood type 3

The wisdom of immediate transfusion is readily seen by the fact that we drained 1500 c c of blood from the spleen before it was sent to the laboratory

Except for pleurisy on the twelfth day recovery was very satisfactory He is free of symptoms and attends daily to business

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 f Th cap l lightly th k d d p q pl N
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 by ry l g g l fy h p d p ly h d l ll wh h fill th so d d
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 g f w p lp ll m g d mb f l g d b t w d ly p t d
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evidence of fibrosis of the splenic substance. There are small areas of necrosis throughout the spleen.

Discussion—The infrequency of Gaucher's disease and the striking similarity to Banti's, namely, the very large spleen, enlarged liver, anemia, leukopenia, no marked hemorrhages, may lead one to overlook the former. I think we were mistaken re-



Fig. 304.—Case I. Histology of the spleen in Gaucher's disease (Crawford).

garding the fluid at the first examination. Fluid is present in the third stage of Banti's disease; adhesions to the diaphragm are quite common.

Gaucher's disease is decidedly more common in females, the ratio being almost 3 to 1. It almost invariably begins before thirteen and shows a strong familial tendency. There may

be no definite symptoms for twenty years. Hemorrhage subcuticular or submucous is frequent. Brownish yellow discoloration of face and hands and the wedge shaped thickening of the conjunctiva are striking phenomena although we overlooked them until Dr Crawford gave us the diagnosis.

Treatment—Drugs and irradiation are of little material value. Inasmuch as the cause of this peculiar disease is not definitely known we cannot say that splenectomy is curative. It relieves the discomfort which after all is more than can be said regarding some other operations.

Case II Splenic Anemia—An Italian age thirty was admitted to the hospital September 23 1926 complainin of weakness epigastric pain and something growing in his abdomen.

Father died at sixty three mother at fifty five cause not known. Two brothers living and well.

Has had the following operations

Bilateral herniorrhaphy inguinal and appendectomy 1915

Mastoidectomy radical left 1918

Cholecystectomy 1924

There is nothing else in the previous history of note except the year preceding the gall bladder operation he had pain in the right upper quadrant which had no relation to food no vomiting and no bleeding.

x Ray showed the stomach ptosed no delay in emptying and no evidence of organic gastro intestinal pathology.

Blood Examination—July 19 1924. Hemo_globin 90 per cent. red blood cells 3 580 000 white blood cells 13 500 coagulation time five minutes ten seconds Wassermann negative.

Urine—Nothing noteworthy.

He was operated upon by the late Dr Despard on July 31st. The liver was grossly normal the gall bladder was thickened markedly adherent to the duodenum the spleen was not examined. The gall bladder was removed and a rubber covered gauze drain inserted. The laboratory reported chronic catarrhal cholecystitis.

He remained well for a year then he complained of a burning pain in the epigastrium. The pain became more or less constant was not influenced by food. Began to lose weight approximately 25 pound. There has been no bleeding. Could not continue his occupation as a truck driver.

On admission September 25 1926 he was pale and emaciated. Superficial lymph glands were not enlarged. The liver extended 3 inches and the spleen 4 inches below the costal border. Free peritoneal fluid could not be demonstrated. Physical examination otherwise revealed nothing unusual. He never has been jaundiced. Urine practically normal. X Ray examination essentially the same as in 1924.

We are indebted to Dr. Harold W. Jones who is intensely interested in blood dyscrasias for the blood examinations.

September 21 1926 Hemoglobin 70 red blood cells 5 610 000 white blood cells 5800 polymorphonuclears 52 lymphocytes 38 monocytes 6 polynuclear eosinophils 3 polynuclear basophils 1. Red blood cells show slight change in shape. No primitive cells seen.

Blood platelets 930 000

Bleeding time 2 to 3 minutes five second

Clotting time 4 to 5 minutes 10 seconds

Clotting extract on normal

Capillary resistance test negative

Flag test red blood cells 0.38 to 0.39 per cent

September 29th Red blood cells 3 420 000 white blood cells 5400 platelets 1 210 000

D	H m t b	Red blood-cells	Wh blood-cells	Platelet	R cells
October 5	72	3 300 000	5 600	1 080 000	1 1
6	Splenectomy	11 30 A M			
6	3 30 P M				
	60	2 990 000	74 000	1 620 000	1 9
7	69	3 230 000	78 400	1 580 000	2 1
8	66	3 000 000	22 120	1 460 000	1
9	64	2 480 000	1 000	1 100 000	2 2
10	63	2 10 000	20 800	1 240 000	1 6
15	64	3 240 000	16 200	1 060 000	1 8
20	62	3 460 000	1 100	1 148 000	2 3

February 20 1927 Hemoglobin 68 red blood cells 3 860 000 white blood cells 18 000 blood plates 1 840 000 polymorphonuclears 50 lymphocytes 40 mononuclears 8 P E 2 red blood cells normal as to size shape and stain Bleeding time one minute clotting time forty second Fragility red blood cells 0.42 to 0.36 per cent

Splenectomy.—October 6 1926 Ether anesthesia Left rectus incision The liver was much enlarged dark in color smooth no scarring The stomach appeared normal No free peritoneal fluid The spleen was quite large firmer than normal and densely adherent to the diaphragm The adhesions were gently separated the spleen delivered from its bed turned toward the right and the subdiaphragmatic space packed with gauze pressure being made against the bleeding diaphragm The pedicle was easily clamped and ligated Ten minutes later when the pack was removed the seepage from the diaphragm had completely stopped The abdomen was closed without drainage

L bo lo y Rep t by D t l B le —Sp t f ple n
gl g 530 g d g 21 12 7 m Th f p pl h
g v a l th g n d t ly f m O t th p h m d li
l op q f m d l l k
7 k f t
R t te h
H t l gy —Se t co t f u t k f m th pl Th cap-
le t gr tly th k n d d th t b le h fib
t u Th hype pl f th p lp type Th pl f l l com
wh t t pl d ca t TI m k d hype pl f th l l g
the es f th pl d th t l f s p ck d th l l m f
c ll Th l d d ll yel cyt m g lobla t d l rg ll
th m d at t f cyt pl a d tw th l t lly pl d
Th c ll t l k e th call d g a t ll f e q e tly te d H dq
k d ea

Postoperative Notes.—The desirability of transfusion was explained to the patient but he declined to have it done He withstood the operation well but appeared quite ill for three days He was out of bed on the twelfth day Four days later he began to bleed from the gums which became alarming in twenty four hours Fifteen units of parathormone was adminis-

tered hypodermically the hemorrhage ceased within two hours. There was no more bleeding up to the time of discharge. October 25, 1926.

Discussion —To review the pathologic report of the spleen we note that the specimen lacked the fibrosis which so often is present in splenic anemia. There are no characteristic changes to enable the pathologist to definitely diagnose splenic anemia. He usually reports an enlarged spleen with various gross and microscopic changes. However, generalized fibrosis, endophlebitis and atrophy of the malpighian corpuscles are often found.

Splenomegaly with secondary anemia, leukopenia, enlargement of the liver, the absence of enlarged superficial lymphatic glands, bleeding from the mucous membranes (50 per cent of the cases) later with digestive disturbances and in the second stage diarrhea ultimately ascites must be regarded as splenic anemia. We prefer to use the terms splenic anemia and Banti's disease interchangeably.

This case is of striking interest because cholecystectomy relieved him of symptoms for a year. He had no hemorrhage prior to operation. He has had at all times an unusually high platelet count, four months after the operation reaching 1,840,000. Bleeding time one minute and clotting time forty seconds very decidedly lessened.

Later Notes —Slight bleeding from the gums recurred six weeks after the operation. Ceanothyn was prescribed and the bleeding diminished. About this time he had a tooth extracted which bled freely for several hours. He was seen last on December 21, 1927. Four days before that he had tarry stools following a laxative. He enjoyed good health for ten months beginning January 1, 1927. One would hesitate to say that splenectomy has been of much benefit to him; at any rate the good results did not endure.

Case III. Purpura Hemorrhagica (Thrombopenic or Thrombocytopenic Purpura) —A male child, age two years and nine months, was referred to Dr. David L. Parley at the Pennsylvania

Hospital November 2 1927 with a history of having become acutely ill four weeks before. The illness began with fatigue pallor sore throat subcutaneous hemorrhages temperature ranging from 101 to 104 F.

In another hospital blood examination showed

D	H m	l b	R d blood cell	Wht bl l	Small lymphocytes	Large lymphocytes	P ly	Pla l
O t b	18	30	3 050 000	5800	68	24	8	
	20	15	1 900 000	2400	88	8	4	10/25/ 7
	21	10	1 300 000	2900	88	4		
	22	10	1 300 000	3500	90	4	6	60 000
	23	10	1 400 000	3000	89	8	3	
	24	10	1 000 000	4000	89	8	3	
	26	25	2 100 000	4000	80	2	18	
	28	50	2 650 000	3000	74	16	10	
	31	40	2 600 000	3600	80		20	

He had four blood transfusions

O t b	19th	250 c	l ft a m
Oct b	3d	250 c c	ght j g l
O tob	26th	300 c	ht jugul r
O t bf	31 t	300	ght j g la

On admission to the Pennsylvania Hospital the temperature was practically normal. Hemorrhagic spots had disappeared. He was cheerful and took nourishment moderately well. The liver extended 4 cm below the costal border in the midclavicular line the spleen 3 cm below the costal case.

Coagulation time three and one half minutes

Bleeding time thirty minutes

It is to be noted that the clotting time was preserved and the bleeding time prolonged which is the rule in hemorrhagic purpura. The platelets ranged from 36 860 to 160 000 although the highest count was not obtained after the operation. He had remissions and exacerbations. There would be a rise in temperature reaching the crest in eleven days then gradually subsiding and ranging near normal for several days.

The advisability of operation was discussed. Splenectomy gives splendid results in purpura hemorrhagica but we knew of no case so young in which the operation had been done for this condition. Operation was decided upon December 8 1927.

Six transfusions were done by Dr Fred Robbins using citrated blood two before the operation. The improvement was sustained only for ten or twelve days. A great deal of blood work was done by Dr Farley and the laboratory force. The hemoglobin varied from 38 to 83 per cent, red cells from 2 100 000 to 3 800 000, white cells from 2100 to 6700, the polynuclears were consistently low.

Splenectomy—December 8, 1927. Ether anesthesia. Left rectus incision.

There was no undue bleeding from the abdominal wall using probably eight ligatures.

Findings. No free fluid in the abdominal cavity. Liver was enlarged but of normal color. Stomach appeared normal. I regarded the spleen as twice the normal size for a child of his age. It was not adherent. Delivery was most difficult partly on account of the incision and because of the short pedicle and very short gastrosplenic omentum which was larger than anticipated. A transverse oblique or curved incision would have afforded better access to the spleen. The application of the clamp to the pedicle was awkward and could not be done without including the wall of the stomach until the gastrosplenic omentum was tied and cut. The pedicle was ultimately ligated. The abdominal wound was closed in layers. Dr Robbins transfused him with 300 c.c. of citrated blood using the left jugular as I was completing the operation.

Lab. & Rep. by Dr W. U. McClellan.—Specimen consists of a spleen approximately 12 x 8 x 4 cm. The color is dark and it appears to be turgid. The blood capsule is smooth and appears to be thickened. The organ is normal in contour. The cut surface shows a capsule not thickened. The pulp is firm, dark brown in color with numerous prominent grayish foci.

Microscopic Examination.—Although the capsule of the spleen is intact and shows no area of thickening its general architecture is characteristically following characteristics: Hyperplasia of the germinal centers. Distention of sinuses and hyperplasia of the stroma and swelling of the endothelial cells lining the sinuses. The malpighian bodies are large and in their center a portion made up of pale hyperplastic lymphoid tissue. Between and filled with blood the sinuses are greatly enlarged frequently appearing as dilated lakes. Among these splenic sinuses the endothelial cells are swollen so that the large pale vesicular nuclei project outward within the sinus and are

uneasily cells with pink tinge ne fish tched to the nasal l g

Discussion—Was unable to make a diagnosis of the disease from examination of the spleen alone due to the fine outflow on to the post which this or in presence of the cells of the hypoplasia of all the elements of the hemolytic (no mobility) erythrocytes. It would be that the organ plays a abnormal role of blood cells with high calcium content to the extent blood destruction is going on. Certainly there is excessive loss of hemoglobin pigment.

Diagnosis—Splenomegaly etiology 1.

The results were discouraging for two months following the operation in fact it was doubtful whether he had improved at all except for one fact—the hemoglobin and red cells did not drop so rapidly during the exacerbations. The skin sutures were removed on the twelfth day. Nine days later the skin began to separate until one half the length of the incision had parted. The aponeurosis held well. There was no attempt at granulation for two months. About March 1, 1928 he began to show decided general improvement the wound also began to granulate. Last transfusion was done February 1, 1928. On March 25th Dr. Farley reports him better in every way.

Hemoglobin 65 per cent red blood-cells 3,650,000 white blood cell 6,000 polymorphonuclears 1 per cent.

Morphology of red cells normal.

Blood platelets appear to be quite large and abundant.

Discussion—This is one of the youngest cases on record of splenectomy for purpura hemorrhagica. Even though the postoperative results were disappointing at first we believe now that he is on the high road to recovery. Exacerbations occasionally recur for several months after the operation. There are no more subcutaneous hemorrhages he eats well and seems quite happy.

Dr. Farley will report the case in detail at the appropriate time.

Patient died since case was reported.

Case IV Myeloid Leukemia—Colored male age forty admitted to the Medical Service of the Pennsylvania Hospital July 6, 1924 complaining of pain in the left side of abdomen.

He had malaria at sixteen and smallpox at twenty. H. 1, 50 pounds in last three months present weight 160 pounds. Gonorrhea five year ago penile ore about the same time. Uses alcohol freely.

Six months ago began to have pain in left ankle knee hip and shoulder. One month later had constant pain in left lower chest and upper abdomen. Last three days pain was very severe requiring morphin. No gastro intestinal symptom no bleeding from mucous membranes except once a nose-bleed two months ago. Noticed enlargement of left side of abdomen three days ago.

On admission Sclera slightly icteric crackling rales throughout both lungs heart slightly enlarged systolic murmur heard at apex and over pulmonic area Spleen enlarged tender extending 16 cm below costal margin liver not palpable No free fluid demonstrable in abdomen Vessels are sclerotic Post cervical axillary and inguinal glands distinctly palpable discrete and firm Temperature range from 99 to 103 F Urine practically negative No note made of uric acid.

Blood examination

July 6 1924 Hemoglobin 67 per cent red blood cells 3 450 000 white blood cells 18 450

Erythrocytes	24
Lymphocytes	30
Tan to als	3
Monocytes	16
Meloblasts	3
No molar	7

R. I. II. I. basophilic degeneration and polkocytes

July 21 1924 Red blood cell 3 200 000 white blood cells 13 600 platelet 360 000

Erythrocytes (neutrophil)	44	} per cent
Erythrocytes (eosinophil)	1	
Melocytes (neutrophil)	2	
Meloblasts	3	} 30 per cent
Lymphocytes (small)	14	
Lymphocytes (large)	9	
Smudge	2	} 30 per cent
Lymphomonocytes	1	
Fractals	3	
Megakaryocytes	1	}
Other platelet elements	1	

Wassermann negative

Nine x ray treatments were given the first was on July 9th The spleen was appreciably reduced in size It was decided by August 4th that all was obtained that could be hoped for with x ray He was transferred to the surgical side Dr Gibbons service where I operated August 11th

Splenectomy — Ether anesthesia Left rectus incision

No free fluid No enlarged mesenteric nodes The omentum was adherent to the parietal peritoneum which had to be liberated before the spleen could be seen The liver was slightly enlarged but firmly adherent to the diaphragm the left lobe more so than the right The stomach and pancreas appeared normal The spleen was definitely adherent a moderate amount of blood was lost before the organ could be delivered The splenic bed was firmly packed the pedicle ligated without difficulty It was impossible to secure all bleeding points A large rubber covered drain with ample gauze exposed at the end was inserted

Lab t y R p t by D ll E Ch p —Th p m t f
 mu h la g d pf m g 25 x 20 10 m a d h g th ck d
 wht capul O th f e f the capul ma v t g of fib ust
 O t th pl n pulp quat ft d h a br l d t d l lt
 p ff a ly th knf S t th gh f mal a d Z le
 M p E m t —F m l Se t Th t t
 f spl t h g g l b f th d se ma f fib u
 t u n fib t typ f pl m g lv th f f e fib l
 app th f t l at Th pl w d ly d t d d
 a d the pe f ly f malp gh pu l th t so th t th
 mpe g al w ll t ul t d f p lpy t ut
 In d t l th ca ty f d blood ll th t k g Th
 ma y p m t l g d the l ll pp thy f th ph cyt typ
 wh l the mbe f m ll lymph yt d c d f h p th m t p m
 ne t th g th p t th h p f e t e ll f th
 pl m d ph l my l yt typ t g th w th m y e t ph l c
 my l yt wh h wd m y pa
 Z k F cat Th t f m th p t bo Th ll
 a d ll t t h m h bett Th lymph od m ll
 a d f numb but w ll h Th bl d l t d f con
 t g bl d f ll d ch ll f th l t d ty Th e ma y
 la g d ply b ph l t g t pe d l th t g f u d
 b
 D g —Spl m g ly th h p e pl a f my l d l m t

He was not transfused. Three volunteer donors—his wife, son, and brother—had a strongly positive Wassermann. We thought unwise to use them. Even though he gave a suggestive history, his own blood was negative.

Postoperative Notes—There was generous oozing from the wound for six weeks. Hemostatic agents were administered without influence. His convalescence was rather stormy. Temperature was of the septic type for five weeks. Ultimately his improvement was satisfactory, so that he was discharged from the hospital October 18th.

He was followed for two years. At the last two visits he had fluid in the abdomen. At this point we lost track of him.

Discussion—The case was regarded as one of atypical myeloid leukemia. The argument against leukemia is the comparatively low white cell count and the many immature cells in the blood stream. The abundance of myeloid cells is evident. The histology of the spleen also is indicative of myeloid leukemia.

The preliminary use of radium or x ray reduces the size of the spleen and the white blood cells and makes splenectomy a fairly safe procedure. Without the irradiation hemorrhage was a serious complication and seemed to be an important factor in the previously high mortality. Radium apparently is more effective than x ray. It will be noted that we had troublesome bleeding in this case in spite of x ray treatment which had distinctly reduced the size of the spleen.

Case V. Myeloid Leukemia—An Italian woman, age thirty-nine, was admitted March 10, 1926, to Dr. Newlin's Medical Service, complaining of pain in the left side of the upper abdomen. No history of bleeding from the mucous membranes. Symptoms began November 15, 1925, with intermittent knife-like pain under the left costal region. Pallor was moderate. No gastrointestinal symptoms except gaseous eructations. The menstrual periods were frequent, not profuse, pale in color. Lost a few pounds in weight. One pregnancy, full term child, thirteen years ago.

On admission her skin was an olive tint more racial than icteroid. The right inguinal glands were the only ones palpable. General physical examination was grossly negative except the abdomen. Liver dulness was increased but the border could not be distinctly felt. The spleen extended 10 cm. below the costal margin was smooth and not especially tender. The notch could not be felt. No abdominal fluid. The urine was practically negative. No mention was made of uric acid which is supposed to be a constant and conspicuous finding in myeloid leukemia.

Blood Examinations — Wassermann negative

March 10 1926 Hemoglobin 65 per cent red blood cells 3952 000 white blood cells 116 000 polymorphonuclears 42 per cent eosinophil 1 per cent myeloblasts 22 per cent myelocytes 28 per cent. Repeated leukocyte counts varied the highest being 356 000 the average about 250 000.

x-Ray treatments were begun under the direction of Dr. Bowen. The spleen diminished in size and the leukocytes dropped to 50 000. There was no marked change in her general condition. At no time did she appear acutely ill. She was transferred to Dr. Gibbon service. I operated April 28 1926.

Splenectomy — Nitrous oxide ether anesthesia. Left rectus incision. Liver slightly enlarged average consistency no scars darker than normal which may have been due to the anesthetic. The spleen was free excepting a few very thin adhesions to the diaphragm. It was easily delivered and removed. Practically no bleeding. Wound closed without drainage. Transfused immediately with 240 cc. of whole blood with the Soresby apparatus.

I b y R p t b D J T B —The pl th t m y h p
t m g 145 95 6 m d w h g 410 gm Th f
g h d m th p l l g l t h th l d Th pl p lp f m
g y h d n l w th f w m fl catt d h m h g po t th gh
t A f m lp h t bly l g d Th f q t
d w d ly p t d
M p E m t —Th lp gh t l ghtly la g d
I t d f b h m g t mp d f ll d ll d ly p h d
th t l t t d n t f m y fl t p lyg l ll w th

large pale vesicular nuclei separated from adjacent cell by narrow sinuses. No suggestion of lymphoid tissue is present here but cell become smaller more compact with deeper staining smaller nuclei in the periphery and arrange themselves in a narrow compact ring about the center. Practically no blood exist in this area. The arteries are slightly thickened and lumina narrowed. Just without the malpighian center the sinuses are prominent arranged concentrically and dilated. Many red blood cells are present within them and many small pyknotic nuclei are scattered throughout. Many of the cells probably conform to atypical polymorphonuclear neutrophils although no cytoplasm can be seen. Scattered throughout are many eosinophilic cells. None generally showing single nuclei and several nucleoli. These cells appear to be without the sinuses containing the red blood cells although at places they occur in the same sinus. The interstitial area contains fewer cells and at places none at all. In other areas both polymorphonuclear eosinophils and neutrophils are present. An occasional dividing cell with hyperchromatic nuclei is seen. The reticulo-endothelial cell lining the sinuses appear normal in size and structure. The vessel walls are thickened and occasional strands of fibrous tissue extend throughout.

Discussion —The increased number of myeloid elements scattered throughout chiefly in the pulp and less so in the sinuses. There is no evidence that the reticulo-endothelial cells are playing an active rôle in the destruction of these cells and no phagocytosis noted.

Dagnosis —Myeloid infiltration of spleen.

Postoperative Notes —On the night following the operation there was free bleeding from the wound the pulse went to 170. The interne opened the wound thinking that the blood came from the abdominal cavity. We anesthetized her examined the splenic fossa carefully but could find no bleeding point. There was however about 4 ounces of clotted blood within the abdomen which was removed and the wound closed. Five hundred c.c. of saline solution was given intravenously. She made a splendid recovery.

Discussion —This was a typical case of myeloid leukemia as evidenced by the high leukocyte count the large percentage of myelocytes and myeloblasts and the microscopic findings in the spleen. The Ray treatment showed encouraging results which we regarded as temporary. So far as we know the patient is enjoying good health. In comparing this case with the previous one we note postoperative hemorrhage in both. The former was atypical and the bleeding could not be controlled at the time of the operation. Therefore the continual bleeding for weeks

was no surprise. The latter however was typical responded to the x ray treatments the operation was easy expeditious and satisfactory in every manner. These 2 cases may serve to recommend the use of radium in preference to x ray as a preliminary to operation in this type of splenomegaly.

CLINIC OF DR. JAMES A. KELLY

MISERICORDIA HOSPITAL

ANEURYSMAL VARIX

JOHN W. aged twenty nine admitted to Hospital January 3 1927 discharged January 24 1927

Patient was admitted complaining of stiffness in the knee and also a bruit on the inner aspect of the thigh. The thigh was injured about one month ago the patient accidentally stabbing himself with a knife. He was a patient here for about three weeks when he was discharged for the holidays to return for operation. The bruit does not seem to be lessening and the joint seems to be getting more stiff. The patient's past history was negative his appetite is good bowels regular respiratory and genito urinary tracts normal. His family history is negative. The physical examination was negative except for the abdomen which showed the scar of an operation for gastric ulcer. In the middle inner side of the right thigh there is a vibration or thrill felt and on auscultation a bruit is heard. By pressure on the femoral artery above the lesion the bruit lessens. Blood pressure Right leg 120/80 left leg 145/100. A pre operative diagnosis was made of arteriovenous aneurysm right femoral artery and vein.

Operation—January 10 1927 Gas and ether anesthesia

Aneurysmorrhaphy—Incision about 5 inches long made on inner aspect of thigh through skin and fascia. Muscles separated. Aneurysmal varix of the femoral artery and vein was found. The communication was incised and a very small clot was found within. Organization had taken place around the varix. The openings in the vein and artery were closed with black silk interrupted sutures and the fascia with No. 2 chromic

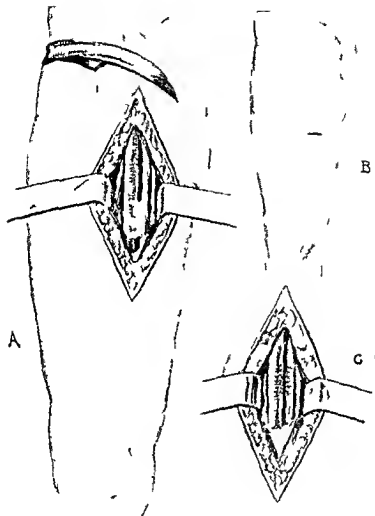


Fig 305—A Sh n t d w g t h w e d t f d t t f
 op at n St f l t t r y d p s e t d Bl d
 apply t l l by t l t n q u t a d b y f catgut l i p p l d t
 b th l B St f t b w d C P f t n of mm
 cat n b t w t d n d th l f t r y d by t
 u p t l k t

catgut and the skin with silk sutures. No drainage (Fig 305)
 Immediately after operation the bruit had disappeared
 All laboratory studies on this patient were normal

One week after operation the convalescence was interrupted by a single chill lasting one hour for which there could be covered no explanation. The stiffness in the knee disappeared when he was allowed to fully move his leg. The wound healed by primary union and the patient was discharged in excellent condition.

Comment—In aneurysmal varix there is a communication between an artery and a vein without the intervention of a sac. It usually results from a stab wound from a sharp instrument and occasionally from venous section. As the result of inflammatory reaction the opening of the artery and vein become adherent to each other and an aneurysmal varix is formed. The communication between the two vessels persists and a stream of arterial blood is projected through the opening with each pulsation of the heart. The vein is later dilated by this continuous arterial pressure. As the arterial blood is projected through this opening a whizzing sound is produced which is pathognomonic of aneurysmal varix. The sound once heard will never be forgotten. It has been described by the late Mr. Spence as the noise which a blue bottle fly imprisoned in a thin paper bag makes in its efforts to regain its freedom. Mott compared it to the purring of a kitten. At times an aneurysmal varix may produce very little trouble. In other cases there develops a dilatation of the vein but not enough to produce any symptoms excepting edema. Both aneurysmal varix and varicose aneurysm are often called arteriovenous aneurysm. Varicose aneurysm differs from aneurysmal varix by the presence of a sac which has developed between the artery and vein.

The treatment of aneurysmal varix may be non-operative or operative. It is non-operative when there is little or no edema, very little pain, and little if any feeling of weight in the leg. A well fitting elastic stocking will probably give relief.

In the case presented to you this morning there was marked pain referred down the inner portion of the thigh, some pain on walking, and slight edema. We therefore deemed it to be one indicating operative treatment.

RUPTURED LIVER INTERNAL HEMORRHAGE

EVELYN M aged eighteen weight 200 pounds was admitted to the hospital on December 6 1927 On the night of admission patient had been sledding and being inexperienced she had struck a tree while travelling downhill at high speed She received the full force of the blow in her epigastrium she was not rendered unconscious but was in great pain and gave evidence of serious injury Examination on admission showed the brow covered with cold sweat and the skin pale there was circumoral pallor of an ashen hue Respirations were slow but labored expansion was limited and patient complained of pain on each inspiration There were no rales no evidence of free fluid in the chest and no evidence of fractured ribs Pulse rate was 80 The abdomen was covered by a heavy layer of adipose tissue was globular and distended to a marked degree The abdomen was diffusely tender to deep palpation the tenderness being more marked in the upper abdomen and liver region Pain was also more marked in the liver region No masses palpable and the presence of shifting fulness was questionable at this time The abdominal wall was not rigid but was tight due to the pressure of gas Patient complained of great pain in the back extending from about the ninth thoracic to the second lumbar vertebra Patient voided a large quantity of clear urine shortly after admission and without any difficulty She has considerable pain in the right shoulder

At this first examination on admission the patient was in a condition of marked shock and any intervention seemed inadvisable at that time Measures were at once instituted to overcome the shock Temperature 95 F pulse 80 respiration 20 blood pressure 112/50 The next day there was still general abdominal pain although the distention had been greatly relieved by enemata and flaxseed poultices Large quantities of gas were passed but only small amounts of fecal matter The general condition of the patient was worse temperature pulse

and respiration slowly going higher and higher. Patient had reacted from shock, leukocyte count being 28 000 white blood cells with no change in hemoglobin or red blood cell. On the following day the tenderness was more localized in the liver region. After consultation with Dr. George P. Muller we concurred in the opinion that there was rupture of the liver requiring operation. There was beginning jaundice.

Blood examinations

12/6/21 Hemoglobin 80 per cent erythrocytes 3 240 000
leukocytes 9000

12/1/27 Hemoglobin 80 per cent erythrocytes 3 200 000
leukocytes 18 500

12/7/21 Leukocytes 28 000

12/8/27 Hemoglobin 80 per cent erythrocytes 3 222 000
leukocytes 28 000

12/8/27 Leukocytes 28 000

12/9/27 Hemoglobin 87 per cent erythrocytes 3 100 000
leukocytes 23 000

12/19/27 Hemoglobin 74 per cent erythrocytes 3 620 000
leukocytes 14 500

12/30/27 Hemoglobin 88 per cent erythrocytes 4 400 000
leukocytes 7100

* Ray findings on 12/7/27 Examination of right shoulder showed no evidence of fracture or dislocation. The acromioclavicular articulation shows a doubtful subluxation. The general film of the abdomen shows strikingly enormous distention of the colon and the coils of the small intestine due to gas. Such great distention by gas always suggests intestinal obstruction and this should be kept in mind until proved otherwise. In this film there is a strong suspicion of fracture of the right transverse process of the fifth lumbar vertebra when her condition will permit a repetition of this film or at least localized examination of this vertebra would be justified. Examination of the pelvis shows no evidence of fracture or dislocation. At the time of the examination the bladder was distended.

12/9/27 Examination of lower two thirds of chest and abdomen shows definite enlargement of the liver shadow upward

The dome of the diaphragm is elevated but smooth. The spleen is visualized and appears normal in size and slightly high in position. There is an enormous amount of distention of the intestinal tract with gas which probably tends to elevate the spleen and liver. The area referred to in the previous examination of the fifth lumbar vertebra shows no evidence of fracture. The vertebrae and ribs show no evidence of fracture.

12 8 27 Operation under ether anesthesia. Exploratory laparotomy and blood transfusion. Incision through the right rectus muscle 8 inches long. Peritoneum blood and bile stained before opening. On opening found filled with fluid blood and in region of the liver some bile. Free bile and blood was aspirated. Extending from the lower surface of the liver and on the posterior surface of the liver there was an irregularly shaped rupture and some free liver tissue. Bleeding has stopped. One cigarette drain under the liver and one drain to the pelvis. Wound closed in layers and silk worm gut tension sutures. Patient given 1000 c.c. salt solution on table and also 500 c.c. of whole blood intravenously. Patient sent back to room in a very weak condition.

On 12 9 21 patient had a turbulent day and seemed to be getting worse until this evening when her temperature dropped 4 degrees in the space of two hours. The pulse and respiration dropped proportionately. On the following day there was a slight rise in temperature and a slight drop in pulse and respirations. The outlook was considerably better and the general condition greatly improved. On 12/15 the cigarette drain was removed and a fresh one inserted. Patient complained of some pain at times over the fifth and sixth ribs near the lateral sternal line. The pain did not radiate and was worse on deep inspiration. The patient was out of bed on 12/28 and was discharged on 1 5/28 in good condition.

Comments.—The interesting feature about this case was the fact that following injury there was a drop in blood count from normal showing hemoglobin about 80 per cent and a red count of 5 240 000. On the two subsequent days there was practically no change in the hemoglobin and red count but the leukocyte count steadily increased from 9000 at the time of admission to

and respiration slowly going higher and higher. Patient had reacted from shock, leukocyte count being 28 000 white blood cells with no change in hemoglobin or red blood cells. On the following day the tenderness was more localized in the liver region. After consultation with Dr. George P. Muller we concurred in the opinion that there was rupture of the liver requiring operation. There was beginning jaundice.

Blood examinations

12/6/27 Hemoglobin 80 per cent erythrocytes 3 240 000
leukocytes 9200

12/11/27 Hemoglobin 80 per cent erythrocytes 3 200 000
leukocytes 18 500

12/17/27 Leukocytes 28 000

12/18/27 Hemoglobin 80 per cent erythrocytes 3 222 000
leukocytes 28 000

12/18/27 Leukocytes 28 000

12/19/27 Hemoglobin 82 per cent erythrocytes 3 100 000
leukocytes 23 000

12/19/27 Hemoglobin 74 per cent erythrocytes 3 620 000
leukocytes 14 500

12/30/27 Hemoglobin 88 per cent erythrocytes 4 400 000
leukocytes 7100

X Ray findings on 12/7/27: Examination of right shoulder showed no evidence of fracture or dislocation. The acromioclavicular articulation shows a doubtful subluxation. The general film of the abdomen shows strikingly enormous distention of the colon and the coils of the small intestine due to gas. Such great distention by gas always suggests intestinal obstruction and this should be kept in mind until proved otherwise. In this film there is a strong suspicion of fracture of the right transverse process of the fifth lumbar vertebra when her condition will permit a repetition of this film or at least localized examination of this vertebra would be justified. Examination of the pelvis shows no evidence of fracture or dislocation. At the time of the examination the bladder was distended.

12/9/27 Examination of lower two thirds of chest and abdomen shows definite enlargement of the liver shadow upward

CHRONIC CHOLECYSTITIS CHOLELITHIASIS WITH COMMON DUCT STONE CHRONIC PANCREATITIS PLEURAL ADHESIONS

MRS MARY K. age fifty two year was admitted to the hospital on February 13 1928 with the chief complaint of pain in the abdomen generalized with indigestion and jaundice. About one year before she was seized with dull pain in the epigastrium which later became general throughout the abdomen. She vomited a greenish substance which looked like bile. On the following day she felt better and then ate some soup. About an hour later she was seized again with dull and later sharp pain in the epigastrium which later became general throughout the abdomen. She then vomited a coffee brown substance. A few days after the second attack she became jaundiced. Since this time patient has been on a diet abstaining from fats sugars and starches. In November 1927 she had her third attack of pain in the epigastrium radiating to the back not to the shoulder but up to the right arm and down the right leg accompanied by vomiting and jaundice. Patient was lightly constipated through the attacks and also was tender over the abdomen. Ten days before admission patient had her last attack of pain indigestion and jaundice it was similar to those previously experienced except that she experienced chill and later perspiration. Patient has lost about 15 pounds in the last year.

The patient had typhoid fever at the age of sixteen and diphtheria at the age of twenty three. Heart examination showed mitral valve first and second sounds are softened sounds clear and distinct. Examination showed the abdomen flabby and somewhat flat. The gall bladder area shows no tenderness or rigidity viscous not palpable liver not enlarged kidneys not palpable no tenderness or rigidity over entire abdomen.

A diagnosis of chronic cholecystitis was made.

Laboratory examinations

Urine 1 2 3 75 Straw colored acid faint trace albumen
no urobilinogen

2/14/28 Amber colored acid 1.025 specific gravity trace albumin no sugar

3/6/28 Amber colored acid specific gravity 1.022 trace albumin no sugar

Microscopic 2/13/28 Occasional leukocytes occasional hyaline casts

2/14/28 Numerous leukocytes few epithelial cells uric acid crystal granular casts

5/6/28 Loaded leukocytes few epithelial cells

x Ray examination 3/8/28 of the chest at two meters showed greatest transverse thoracic diameter 24 cm greatest transverse cardiac diameter 17 cm indicating very slight but definite increase in the transverse diameter of the heart. The arch of the aorta is also definitely enlarged particularly in the descending portion. The dome of the right diaphragm is elevated at least 2 inches above the level of the left. The costophrenic angle is obliterated. There is a rather sharp angulation at about the middle of the dome of the diaphragm indicating fixation probably the result of pleural adhesions. There is an extremely fine milky dense infiltration in the right apex suggesting an old and probably healed tuberculous process. The abdominal film shows the liver normal in size definitely high in position. The right kidney appears to be high in position the left kidney appears normal. The lower pole of the right kidney is at least 2 inches higher than the lower pole of the left.

Operation performed under ether anaesthesia. Midline incision through skin about 2 inches above umbilicus and about 1 inch below incision carried through skin subcutaneous tissue rectal sheath rectus muscle fibers separated peritoneum exposed incised and peritoneal cavity exposed. Intestines and stomach packed away from liver and gall bladder with hand packs. Gall bladder delivered to wound viscus was very much enlarged about size of cucumber. Gall bladder coats were thickened showed several small adhesions between it and stomach. Bladder contents showed no stones bile was clear apparently not infected cystic duct exposed common duct isolated and exposed. A soft stone about the size of a pea was

embedded in the internal wall of the duct. Some difficulty in removing. Common duct incised and stone removed. T tube placed in common duct, tube also placed in gall bladder for drainage. Peritoneum sutured. Layers closed in respective manner. Skin closed with silk tension sutures. Pancreas enlarged and chronically diseased. Patient left operating room in good condition.

Patient complained of some pain in the abdomen following operation. was quite restless and the common duct drained as well as the gall bladder. The drainage was quite free and a note on 3/3/78 stated that the dressings were saturated with bile. She complained of some pain in the left shoulder. Adhesive straps were applied to the chest and up to the angle of the scapula. A note on 3/19 states that there was little drainage that alcohol and dry dressings were applied on that date and the patient discharged in good condition.

Comments —The interesting feature of this case is the fact that the stone causing obstruction of the common duct was permanently adherent to one portion of the wall of the common duct necessitating not only direct incision over the stone but considerable dissection to remove the stone from its site of attachment to the wall of the common duct. The gall bladder was not removed in this case on account of the condition of the head of the pancreas which showed all the evidence of a progressive pancreatitis. It was felt that if there should be any stricture of the common duct at the site of the removal of the stone the retention of the gall bladder might be necessary to perform a cholecystoduodenostomy for internal drainage.

ACUTE CHOLECYSTITIS CHOLELITHIASIS

EDWARD O. K. age thirty five admitted to the hospital 3/16/28 with the chief complaint of severe pain in the epigastrium. Five days before admission he suffered severe sharp pain in the epigastrium which continued nine hours and then radiated to the gall bladder region where it still remains. There was no jaundice. Patient has had several attacks of colicky pain in the epigastrium since one year ago. He is constipated but his general health is good.

Examination on admission showed the heart to be regular with the muscle tone good and no adventitious sounds. The apex beat in the fifth interspace. Examination of the abdomen showed tenderness in the region of the epigastrium, gall bladder and duodenum. Liver, spleen and kidneys not palpable. No masses.

Laboratory examination

Urinalysis 3/16/28 Straw colored acid specific gravity 1.016 no albumin no sugar urate crystals

3/17/28 Amber colored alkaline specific gravity 1.022 no sugar no crystals phosphates

Blood examination 3/16/28 Hemoglobin 90 per cent erythrocytes 5,100,000 leukocytes 7600

x Ray examination General film of abdomen showed upward displacement of liver. Kidneys are normal in size and position. Two special films were made of gall bladder region which show an irregular shadow approximately $3\frac{1}{2} \times 1\frac{1}{2}$ inches situated in the region of the gall bladder which might be due to a deformed enlarged and diseased gall bladder.

3/16/28 Operation Cholecystectomy

Incision from costal margin to umbilicus 1 inch from mid line. Rectus sheath cut muscle separated posterior sheath and peritoneum incised. Gall bladder was greatly distended—size of duck egg—wall edematous and thickened. Gall bladder aspirated dark green bile. Gall bladder carefully dissected about

50 small stones about the size of a marble were found in the cystic duct and scooped out. The duct was clamped and cut and ligated. Penrose drain inserted in remnants of bladder peritoneal edges sutured to under surface of liver. Cigarette

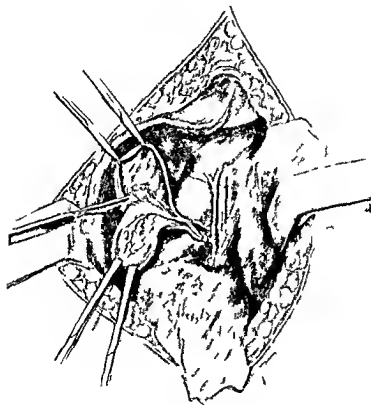


Fig 306—Sh w g m th d f p e f m g h l y t t m y b m v i g
g l l b l d d f o m f d d y t d t f t h w y t h b l d p p l y c a
b b t t o t l l d d t h d g f l g t g t o o l s e t t h m
m d t

drain in foramen of Winslow and beneath the liver. Incision closed. Patient left the operating room in good condition.

Drains were removed on 3/19/28 incision clean. Abdomen distended and relieved by asafetida high colonic irrigation.

On 2/23/28 there was a slight rise of temperature and the upper angle of the wound was draining pus. Skin sutures were removed on 3/25/28 and tension sutures on 3/26/28. Patient was discharged on 4/3/28 in good condition.

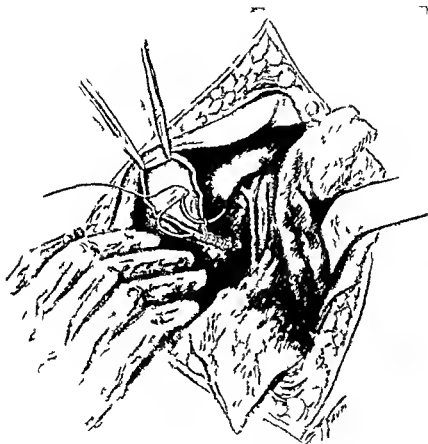


Fig. 30 — After removal of the gall bladder showing method of closing bed of the gall bladder by approximating cut edges of peritoneal covering of gall bladder. In case of acute cholecystitis the cigarette drain may be placed within the line of suture and drain the stump of the cystic duct. In chronic cholecystitis there is no drain placed here.

Pathologic specimen 3/16/28. Gall bladder 1.5 x .5 inches thickened and fibrous. Mucosa irregularly thickened contains mucous and several small sized calculi.

Microscopic diagnosis. Chronic cholecystitis and cholelithiasis.

Comments—In this case of acute cholecystitis operation was performed within a few hours after the patient's admission to the hospital on account of the severe pain which had continued for nine to twelve hours and with the thought that perforation of the gall bladder was about to occur. I believe that these cases of acute cholecystitis should be operated on as soon as the proper laboratory studies have been made and that when possible the gall bladder should be removed unless there is some pathology of the common duct. It has been my opinion that separation of the gall bladder from the overlying peritoneal covering and from the bed of the liver is easier in these cases of acute cholecystitis than in the chronic form and that if care is taken not to tear the cystic duct it is feasible to ligate the stump of the cystic duct approximating the cut edges of the peritoneum over the gall bladder bed and inserting a Penrose drain to the stump of the cystic duct for forty eight hours. Drainage of the peritoneal cavity is no more indicated in these cases than in cases of chronic cholecystitis.

